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Philip Thicknesse Horn delin.

Barlow sculp.

DOVER CASTLE.

1 The Keep.

2 The Old Entrance and

4 Old Church in Ruins.

5 The New Entrance.

8 Old Road to Deal.

9 St. James's Church.

10 Moats Bulwark Fort and

a communication with the Castle by a Passage through the Rock.

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AN

HISTORICAL MISCELLANY

OF THE

Earl of Newburgh

CURIOSITIES AND RARITIES

IN

NATURE AND ART.

COMPRISING

NEW AND ENTERTAINING DESCRIPTIONS

OF THE MOST SURPRISING

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VOLUME THE FOURTH.

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OF THE

CURIOSITIES AND RARITIES

IN NATURE AND ART.

OF THE NATURE AND PHENOMENA OF COMETS.

[From the ENCYCLOPÆDIA LONDINENSIS.]

OF all the celeſtial phenomena, comets have given riſe to the greateſt number of ſpeculations and conjectures. Their ſtrange appearance has in all ages been a matter of terror to the uninformed, who have generally looked upon them to be evil omens, and forerunners of war, peſtilence, &c. Thus, in ancient times, they were imagined to be prodigies hung out by the immediate hand of God in the heavens, and intended to alarm the world. Their nature being now better underſtood, they are no longer terrible: but as there are ſtill many who think them to be ſupernatural warnings, portents of future events, it may not be improper to obſerve, that the architect of the univerſe has framed every part according to divine order, and ſubjected all things to laws and regulations; that he does not hurl at random ſtars and worlds, and diſorder the ſyſtem of the whole glorious frame, to produce falſe apprehenſions of diſtant events, fears without foundation and without uſe. Religion glories in the teſt of reaſon, of knowledge, and of true wiſdom; it is every way connected with, and is always elucidated by, them. From philoſophy we may learn, that, the more the works of the ſupreme Author of the univerſe are underſtood, the more he muſt be adored; and that his ſuperintendency over every portion is more clearly evinced, and more fully expreſſed, by their unvaried courſe, than by ten thouſand deviations.

The exiſtence of an univerſal connection between all parts of the ſiderial heavens is now generally admitted. Comets undoubtedly form a part of this great chain; but of the part they occupy, and of the uſes for which they exiſt, we are in a great meaſure ignorant. It is a portion of ſcience whoſe perfection is reſerved for ſome diſtant day, when theſe bodies, and their vaſt orbits, may, by long and

accurate obfervation, be added to the known parts of the folar fyftem; when aftronomy will appear with new lights, after all our difcoveries, great as we at prefent imagine them to be. Upon the whole, the aftronomy of comets is very imperfect; for but little can be known with certainty where but little can be feen. Comets afford few obfervations on which to ground conjecture, and are for the greateft part of their courfe beyond the reach of human vifion. They are fometimes called blazing ftars, becaufe they are ufually attended with a long train of light, tending always oppofite to the fun, and of a fainter luftre the farther it is from the body of the comet. And hence arifes the divifion of comets into three kinds, viz. bearded, tailed, and hairy; though, in reality, this divifion rather relates to the feveral circumftances of the fame comet, than to the phenomena of feveral. Thus, when the comet is eaftward of the fun, and moves from him, it is faid to be bearded, becaufe the light precedes it in the manner of a beard. When the comet is weftward of the fun, and fets after him, it is faid to be tailed, becaufe the train of light follows it in the manner of a tail. And, laftly, when the fun and comet are diametrically oppofite, the earth being between them, the train is hid behind the body of the comet, excepting the extremities, which, being broader than the body of the comet, appear as it were around it, like a border of hair, or *coma*, from whence the comet derives its name. But there have been comets whofe difk was clear, round, and well-defined, as that of Jupiter, without either tail, beard, or coma.

Philofophers and aftronomers, of all ages, have been much divided in their opinions as to the nature of comets. Diodorus Siculus and Apollonius Myndius, in Seneca, inform us, that many of the Chaldeans held them to be lafting bodies, having ftated revolutions as well as the planets, but in orbits vaftly more extenfive; on which account they are only vifible while near the earth, but difappear again when they go into the higher regions. Others of them were of opinion, that the comets were only meteors raifed very high in the air, which blaze for a while, and difappear when the matter of which they confift is confumed or difperfed. Some of the Greeks, before the time of Ariftotle, fuppofed that a comet was a vaft heap or affemblage of very fmall ftars meeting together, by reafon of the inequalities of their motions, and fo uniting into a vifible mafs, by the union of all their fmall lights; which muft again difappear, as thofe ftars feparated, and each proceeded in its courfe. Pythagoras, however, accounted them a kind of planets or wandering ftars, difappearing in the fuperior parts of their orbits, and becoming vifible only in the lower parts of them. But Ariftotle held, that comets were only a kind of tranfient fires, or meteors, confifting of exhalations raifed to the upper region of the air, and there fet on fire; far below the courfe of the moon.

Seneca, who lived in the firft century, and who had feen two or three comets himfelf, plainly intimates that he thought them above the moon; and argues ftrongly againft thofe who fuppofed them to be meteors, or who held other abfurd opinions concerning them; declaring his belief that they were not fires fuddenly kindled, but the eternal productions of nature. He points out alfo the only way to arrive at a certainty on this fubject, viz. by collecting a number of obfervations concerning their appearance, in order to difcover whether

whether they return periodically or not. "For this purpoſe (ſays he) one age is not ſufficient; but the time will come when the nature of comets and their magnitudes will be demonſtrated, and the routes they take, ſo different from the planets, explained. Poſterity will then wonder, that the preceding ages ſhould be ignorant of matters ſo plain and eaſy to be known." For a long time this prediction of Seneca ſeemed not likely to be fulfilled; and Tycho Brahe was the firſt among the moderns who reſtored the comets to their true rank in the creation; for, after diligently obſerving the comet of 1577, and finding that it had no ſenſible diurnal parallax, he aſſigned it its true place in the planetary regions. See his book de Cometa, anni 1577.

Hevelius, from a great number of obſervations, propoſed it as his opinion, that the comets, like the ſolar maculæ, or ſpots, are formed or condenſed out of the groſſer exhalations of his body; in which he differs but little from the opinion of Kepler. James Bernoulli, in his Syſtema Cometarum, imagined that comets were no other than the ſatellites of ſome very diſtant planet, which was itſelf inviſible to us on account of its diſtance, as were alſo the ſatellites unleſs when in a certain part of their orbits. Des Cartes advances another opinion: he conjectures that comets are only ſtars, formerly fixed, like the reſt, in the heavens; but which becoming gradually covered with maculæ, or ſpots, and at length wholly deprived of their light, cannot keep their places, but are carried off by the vortices of the circumjacent ſtars; and, in proportion to their magnitude and ſolidity, moved in ſuch a manner, as to be brought nearer the orb of Saturn, and thus, coming within the reach of the ſun's light, rendered viſible.

But the vanity of all theſe hypotheſes now abundantly appears from the obſerved phenomena of comets, and from the doctrine of Sir Iſaac Newton. The comets, he ſays, are compact, ſolid, fixed, and durable, bodies; in fact, a kind of planets, which move in very oblique and eccentric orbits, every way, with the greateſt freedom; perſevering in their motions, even againſt the courſe and direction of the planets: and their tail is a very thin and ſlender vapour, emitted by the head or nucleus of the comet, ignited or heated by the ſun. This theory of comets at once ſolves their principal phenomena, which are as follow:

Firſt, Thoſe comets which move according to the order of the ſigns, do all, a little before they diſappear, either advance ſlower than uſual, or elſe go retrograde, if the earth be between them and the ſun; but more ſwiftly if the earth be placed in a contrary part. On the other hand, thoſe which proceed contrary to the order of the ſigns, move more ſwiftly than uſual, if the earth be between them and the ſun; and more ſlowly, or elſe are retrograde, when the earth is in a contrary part. For, ſince this courſe is not among the fixed ſtars, but among the planets, as the motion of the earth either conſpires with them, or goes againſt them, their appearance, with reſpect to the earth, muſt be changed; and, like the planets, they muſt ſometimes appear to move ſwifter, ſometimes ſlower, and ſometimes to be retrograde. 2. So long as their velocity is increaſed, they nearly move in great circles; but, towards the end of their courſe, they deviate from thoſe circles; and, when the earth proceeds one way, they go the contrary way. Becauſe, in the end of their courſe, when they recede almoſt directly from the ſun, that

part of the apparent motion which arifes from the parallax, muft bear a greater proportion to the whole apparent motion. 3. The comets move in ellipfes, having one of their foci in the centre of the fun; and, by radii drawn to the fun, defcribe areas proportional to the times. Becaufe they do not wander precarioufly from one fictitious vortex to another; but, making a part of the folar fyftem, return perpetually, and run a conftant round. Hence, their elliptic orbits being very long and eccentric, they become invifible when in that part which is moft remote from the fun. And, from the curvity of the paths of comets, Sir Ifaac Newton concludes, that, when they difappear, they are much beyond the orbit of Jupiter; and that, in their perihelion, they frequently defcend within the orbits of Mars and the inferior planets. 4. The light of their nuclei, or bodies, increafes as they recede from the earth towards the fun; and, on the contrary, it decreafes as they recede from the fun. Becaufe, as they are in the regions of the planets, their accefs towards the fun bears a confiderable proportion to their whole diftance. 5. Their tails appear the largeft and brighteft immediately after their tranfit through the region of the fun, or after their perihelion. Becaufe then their heads, being the moft heated, will emit the moft vapours. From the light of the nucleus we infer their vicinity to the earth, and that they are by no means in the region of the fixed ftars, as fome have imagined; fince, in that cafe, their heads would be no more illuminated by the fun than the planets are by the fixed ftars. 6. The tails always decline from a juft oppofition to the fun towards thofe parts which the nuclei or bodies pafs over, in their progrefs through their orbits. Becaufe all fmoke, or vapour, emitted from a body in motion, tends upwards obliquely, ftill receding from that part towards which the fmoking body proceeds. 7. This declination, *cæteris paribus*, is the fmalleft when the nuclei approach neareft the fun: and it is alfo lefs near the nucleus, or head, than towards the extremity of the tail. Becaufe the vapour afcends more fwiftly near the head of the comet, than in the higher extremity of its tail; and alfo when the comet is nearer the fun, than when it is farther off. 8. The tails are fomewhat brighter, and more diftinctly defined, in their convex than in their concave part. Becaufe the vapour in the convex part, which goes firft, being fomewhat nearer and denfer, reflects the light more copioufly. 9. The tails always appear broader at their upper extremity, than nearer the centre of the comet. Becaufe the vapour in a free fpace continually rarefies and dilates. 10. The tails are always tranfparent, and the fmalleft ftars appear through them. Becaufe they confift of infinitely thin vapour.

The nuclei, which are the heads, or bodies, of comets, viewed through a telefcope, fhew a face very different from thofe of the fixed ftars or planets. They are liable to apparent changes, which Sir Ifaac Newton afcribes to changes in their atmofphere; and this opinion was confirmed by obfervations of the comet in 1744. Hift. Acad. Scienc. 1744. Sturmius fays, that, by obferving the comet of 1680 with a telefcope, it appeared like a coal dimly glowing, or a rude mafs of matter illuminated with a dufky fumid light, lefs fenfible towards the extremes than in the middle; whereas a ftar appears with a round difk, and a vivid light.

Of

Of the comet of 1661, Hevelius obferves, that its body was of a yellowifh colour, very bright and confpicuous, but without any glittering light: in the middle was a denfe ruddy nucleus, almoft equal to Jupiter, encompaffed by a much fainter, thinner, matter. Feb. 5, its head was fomewhat larger and brighter, and of a gold colour; but its light more dufky than the ftars: and here the nucleus appeared divided into feveral parts. February 6, the difk was leffened; the parts of the nucleus ftill exifted, though lefs than before: one of them, on the lower part of the difk, on the left, much denfer and brighter than the reft; its body round, and reprefenting a very lucid little ftar: the nuclei ftill encompaffed with another kind of matter. February 10, the head fomewhat more obfcure, and the nuclei more confufed, but brighter at top than bottom. February 13, the head diminifhed much both in fize and fplendour. March 2, its roundnefs a little impaired, and its edges lacerated, &c. March 28, very pale, and exceeding thin; its matter much difperfed; and no diftinct nucleus at all appearing. Weigelius, who faw the comet of 1664, as alfo the moon, and a fmall cloud in the horizon illuminated by the fun at the fame time, obferved, that through the telefcope the moon appeared of a continued luminous furface: but the comet very different; being exactly like the little cloud. And from thefe obfervations it was that Hevelius formed his opinion, that comets are like maculæ or fpots formed out of the folar exhalations.

The eftimates that have been given of the magnitude of comets by Tycho Brahe, Hevelius, and fome others, are not very accurate; as it does not appear that they diftinguifhed between the nucleus and the furrounding atmofphere. Thus Tycho computes that the true diameter of the comet in 1577 was in proportion to the diameter of the earth, as 3 is to 14; and Hevelius made the diameter of the comet of 1652 to that of the earth, as 52 to 100. But the diameter of the atmofphere is often 10 or 15 times as great as that of the nucleus: the former, in the comet of 1682, was meafured by Flamftead, and found to be 2′, when the diameter of the nucleus alone was only 11″ or 12″. Though fome comets, eftimated by a comparifon of their diftance and apparent magnitude, have been judged much larger than the moon, and even equal to fome of the primary planets. The diameter of that of 1744, when at the diftance of the fun from us, meafured about 1′, which makes its diameter about three times that of the earth: at another time, the diameter of its nucleus was nearly equal to that of the planet Jupiter.

There have been various conjectures concerning the nature of the tails of comets. The opinion of the ancient philofophers and of Ariftotle himfelf, was, that the tail is a very thin fiery vapour arifing from the comet. Apian, Cardan, Tycho, and others, believed, that the fun's rays, being propagated through the tranfparent head of the comet, were refracted, as in a lens. But the figure of the tail does not anfwer to this; and, moreover, there fhould be fome reflecting fubftance to render the rays vifible, in like manner as there muft be duft or fmoke flying about in a dark room, in order that a ray of light entering it may be feen by a fpectator ftanding fide-ways from it. Kepler fuppofed, that the rays of the fun carry away fome of the grofs parts of the comet which reflects the fun's rays, and gives the appearance of a tail. Hevelius thought, that the thinneft parts of the atmofphere of a comet are rarefied by the force of the

 heat,

heat, and driven from the forepart and each ſide of the comet towards the parts turned from the ſun. Sir Iſaac Newton thinks, that the tail of a comet is a very thin vapour, which the head, or nucleus, of a comet, ſends out by reaſon of its heat. He ſuppoſes, that, when a comet is deſcending to its perihelion, the vapours behind the comet, in reſpect to the ſun, being rarefied by the ſun's heat, aſcend, and take up with them the reflecting particles with which the tail is compoſed, as air rarefied by heat carries up the particles of ſmoke in a chimney. But, as beyond the atmoſphere of a comet, the ethereal air *(auram æthereum)* is extremely rare, he attributes ſomething to the ſun's rays carrying with them the particles of the atmoſphere of the comet. And, when the tail is thus formed, it, like the nucleus, gravitates towards the ſun; and, by the projectile force it received from the comet, it deſcribes an ellipſe about the ſun, and accompanies the comet. It conduces alſo to the aſcent of theſe vapours, that they revolve about the ſun, and therefore endeavour to recede from it; whilſt the atmoſphere of the ſun is either at reſt or moves with ſuch a ſlow motion as it can acquire from the rotation of the ſun about its axis. Theſe are the cauſes of the aſcent of the tails in the neighbourhood of the ſun, where the orbit has a greater curvature, and the comet moves in a denſer atmoſphere. The tail of the comet therefore, being formed from the heat of the ſun, will increaſe till it comes to its perihelion, and decreaſe afterwards. The atmoſphere of the comet is diminiſhed as the tail increaſes, and is leaſt immediately after the comet has paſſed its perihelion, where it ſometimes appears covered with a thick black ſmoke. As the vapour receives two motions when it leaves the comet, it goes on with the compound motion, and therefore the tail will not be turned directly from the ſun, but decline from it towards thoſe parts which are left by the comet; and, meeting with a ſmall reſiſtance from the ether, will be a little curved. When the ſpectator therefore is in the plane of the comet's orbit, the curvature will not appear. The vapour, thus rarefied and dilated, may be at laſt ſcattered through the heavens, and be gathered up by the planets, to ſupply the place of thoſe fluids which are ſpent in vegetation, and converted into earth. This is the ſubſtance of Sir Iſaac Newton's account of the tails of comets.

But Mr. Rowning, not ſatisfied with this ſolution of the phenomena, accounts for the tails of comets in the following manner: It is well known, ſays he, that when the ſun's light paſſes through the atmoſphere of any body, as the earth, that which paſſes on one ſide is by the refraction made to converge towards that which paſſes on the oppoſite ſide; and this convergency is not wholly effected either at the entrance of the light into the atmoſphere, or at its exit on going out; but, beginning at its entrance, it increaſes in every point of its progreſs. It is alſo agreed, that the atmoſpheres of the comets are very large and denſe: he therefore ſuppoſes, that by ſuch time as the light of the ſun has paſſed through a conſiderable part of the atmoſphere of the comet, the rays are ſo far refracted towards each other, that they then begin ſenſibly to illuminate it, or rather the vapours floating in it, and ſo render that part they have yet to paſs through viſible to us: and that this portion of the atmoſphere of a comet, thus illuminated, appears to us in the form of a beam of the ſun's light, and paſſes under the denomination of a comet's tail. Rowning's Nat. Philoſ. part 4, chap. 11.

M. Euler,

M. Euler, Mem. Berlin, tom. ii. p. 117, thinks there is a great affinity between the tails of comets, the zodiacal light, and the aurora borealis, and that the common cause of all of them is the action of the sun's light on the atmospheres of the comets, of the sun, and of the earth. He supposes, that the impulse of the rays of light on the atmosphere of comets may drive some of the finer particles of that atmosphere far beyond its limits; and that this force of impulse, combined with that of gravity towards the comet, would produce a tail, which would always be in opposition to the sun, if the comet did not move. But the motion of the comet in its orbit, and about an axis, must vary the position and figure of the tail, giving it a curvature, and deviation, from a line joining the centres of the sun and comet; and, that this deviation will be greater, as the orbit of the comet has the greater curvature, and as the motion of the comet is more rapid. It may even happen, that the velocity of the comet, in its perihelion, may be so great, that the force of the sun's rays may produce a new tail, before the old one can follow; in which case, the comet might have two or more tails. The possibility of this is confirmed by the comet of 1744, which was observed to have several tails while it was in its perihelion.

Dr. Hamilton, in his Philosophical Essays, urges several objections against the Newtonian hypothesis; and observes, that we have no absolute proof of the existence of a solar atmosphere; and, if we had, that, when the comet is moving in its perihelion in a direction at right angles to the direction of its tail, the vapours which then arise, partaking of the great velocity of the comet, and being also specifically lighter than the medium in which they move, must suffer a much greater resistance than the dense body of the comet does, and therefore ought to be left behind, and would not appear opposite to the sun; and afterwards they ought to appear towards the sun. Also, if the splendour of the tails be owing to the reflection and refraction of the sun's rays, it ought to diminish the lustre of the stars seen through it, which would have their light reflected and refracted in like manner, and consequently their brightness would be diminished.

Dr. Halley, in his description of the aurora borealis in 1716, says, "The streams of light so much resembled the long tails of comets, that at first sight they might well be taken for such." And afterwards, "this light seems to have a great affinity to that which the effluvia of electric bodies emit in the dark." Phil. Trans. No. ccxlvii. D. de Mairan also calls the tail of a comet, the aurora borealis of the comet. This opinion Dr. Hamilton supports by the following arguments:—A spectator, at a distance from the earth, would see the aurora borealis in the form of a tail opposite to the sun, as the tail of a comet lies. The aurora borealis has no effect upon the stars seen through it, nor has the tail of a comet. The atmosphere is known to abound with electric matter, and the appearance of the electric matter in vacuo is exactly like the appearance of the aurora borealis, which, from its great altitude, may be considered to be in as perfect a vacuum as we can make. The electric matter in vacuo suffers the rays of light to pass through, without being affected by them. The tail of a comet does not expand itself sideways, nor does the electric matter. Hence he supposes the tails of comets, the aurora borealis, and the electric fluid, to be matter of the same kind. We may add, as a farther confirmation of this opinion, that the comet

comet in 1607 appeared to ſhoot out the end of its tail. Le P. Cyſat remarked the undulations of the tail of the comet in 1618. Hevelius obſerved the ſame in the tails of the comets in 1652 and 1661. M. Pingré took notice of the ſame appearance in the comet of 1769. These are circumſtances exactly ſimilar to the aurora borealis. Dr. Hamilton conjectures, that uſe of the comets may be to bring the electric matter, which continually eſcapes from the planets, back into the planetary regions. "Theſe arguments (ſays Mr. Vince, Plumian Profeſſor of Aſtronomy in the Univerſity of Cambridge) are ſtrongly in favour of this hypotheſis; and, if this be true, we may farther add, that the tails are hollow; for, if the electric fluid only proceed in its firſt direction, and do not diverge ſideways, the parts directly behind the comet will not be filled with it; and this thinneſs of the tails will account for the appearance of the ſtars through them."

With reſpect to the motions of comets, Kepler, who had an opportunity of obſerving two of them, concluded, "that comets moved freely through the planetary orbs, with a motion not much different from a rectilinear one; but of what kind he could not preciſely determine." Hevelius embraced the ſame hypotheſis of a rectilinear motion; but, finding his calculations did not perfectly agree with his obſervations, he concluded, "that the path of a comet was bent in a curve line, concave towards the ſun." He ſuppoſed a comet to be generated in the atmoſphere of a planet, and to be diſcharged from it, partly by the rotation of the planet, and then to revolve about the ſun in a parabola by the force of projection and its tendency to the ſun, in the ſame manner as a projectile upon the earth's ſurface deſcribes a parabola. At length, the famous comet in 1680, deſcending nearly in a right line towards the ſun, aroſe again from it in like manner, which proved its motion in a curve about the ſun. G. S. Doërfell, miniſter at Plaven in Upper Saxony, made obſervations upon this comet, and found that its motion might be very well repreſented by a parabola, having the ſun in its focus. He was ignorant, however, of the laws by which the motion of a body in a parabola is regulated, and erred conſiderably in his parabola, making the perihelion diſtance about twelve times greater than it was. This was publiſhed five years before the Principia, in which work Sir Iſaac Newton having proved that Kepler's law, by which the motions of the planets are regulated, was a neceſſary conſequence of his theory of gravity, it immediately followed, that comets were governed by the ſame law; and the obſervations upon them agreed ſo accurately with his theory, as to leave no doubt of its truth. To prove that comets deſcribe ellipſes, and not parabolas or hyperbolas, Dr. Halley, in his Synopſis of the Aſtronomy of Comets, advances the following reaſons:

"Hitherto I have conſidered the orbits of comets as exactly parabolic; upon which ſuppoſition it would follow, that comets, being impelled towards the ſun by a centripetal force, would deſcend as from ſpaces infinitely diſtant; and, by their ſo falling, acquire ſuch a velocity, as that they may again fly off into the remoteſt parts of the univerſe, moving upwards with a perpetual tendency, ſo as never to return again to the ſun. But, ſince they appear frequently enough, and ſince none of them can be found to move with an hyperbolic motion, or a motion ſwifter than what a comet might acquire by its gravity

gravity to the ſun, it is highly probable they rather move in very eccentric elliptic orbits, and make their returns after long periods of time: for ſo their number will be determinate, and, perhaps, not very great. Beſides, the ſpace between the ſun and fixed ſtars is ſo immenſe, that there is room enough for a comet to revolve, though the period of its revolution be vaſtly long. Now, the latus rectum of an ellipſis is to the latus rectum of a parabola, which has the ſame diſtance in its perihelion, as the diſtance of the aphelion, in the ellipſis, is to the whole axis of the ellipſis: and the velocities are in a ſubduplicate ratio of the ſame: wherefore, in very eccentric orbits, the ratio comes very near to a ratio of equality; and the very ſmall difference which happens, on account of the greater velocity in the parabola, is eaſily compenſated in determining the ſituation of the orbit. The principal uſe therefore, continues Dr. Halley, of the Table of the elements of their motions, and that which induced me to conſtruct it, is that, whenever a new comet ſhall appear, we may be able to know, by comparing together the elements, whether it be any of thoſe which has appeared before, and conſequently to determine its period, and the axis of its orbit, and to foretel its return. And, indeed, there are many things which make me believe, that the comet which Apian obſerved in the year 1531, was the ſame with that which Kepler and Longomontanus more accurately deſcribed in the year 1607; and which I myſelf have ſeen return, and obſerved in the year 1682. All the elements agree, and nothing ſeems to contradict this my opinion, beſides the inequality of the periodic revolutions: which inequality is not ſo great neither, as that it may not be owing to phyſical cauſes. For the motion of Saturn is ſo diſturbed by the reſt of the planets, eſpecially Jupiter, that the periodic time of that planet is uncertain for ſome whole days together. How much more, therefore, will a comet be ſubject to ſuch-like errors, which riſes almoſt four times higher than Saturn, and whoſe velocity, though increaſed but a very little, would be ſufficient to change its orbit, from an elliptical to a parabolical one. And I am the more confirmed in my opinion of its being the ſame; for, in the year 1456, in the ſummer-time, a comet was ſeen paſſing retrograde between the earth and the ſun, much after the ſame manner; which, though nobody made obſervations upon it, yet, from its period, and the manner of its tranſit, I cannot think different from thoſe I have juſt now mentioned. And ſince, looking over the hiſtories of comets, I find, at an equal interval of time, a comet to have been ſeen about Eaſter in the year 1305, which is another double period of 151 years before the former. Hence, I think, I may venture to foretel that it will return again in the year 1758."

Dr. Halley computed the effect of Jupiter upon this comet in 1682, and found that it would increaſe its periodic time above a year, in conſequence of which he predicted its return at the end of the year 1758, or the beginning of 1759. He did not make his computations with the utmoſt accuracy, but, as he himſelf informs, *levi calamo*. M. Clairaut computed the effects both of Saturn and Jupiter, and found that the former would retard its return in the laſt period 100 days, and the latter 511 days; and he determined the time when the comet would come to its perihelion to be on April 15, 1759, obſerving that he might err a month, from neglecting ſmall quantities in the computation. It paſſed the perihelion on March 13, within

thirty-three days of the time computed. Now, if we ſuppoſe the time ſtated by Dr. Halley to mean the time of its paſſing the perihelion, then, if we add to that 100 days, ariſing from the action of Saturn which he did not conſider, it will bring it very near to the time in which it did paſs the perihelion, and prove his computation of the effect of Jupiter to have been very accurate. If he mean the time when it would firſt appear, his prediction was very accurate, for it was firſt ſeen on the 14th day of December, in the year 1758; and his computation of the effects of Jupiter will then be more accurate than could have been expected, conſidering that he made his calculations only by an indirect method, and in a manner profeſſedly not very accurate. Dr. Halley therefore had the glory firſt to foretel the return of a comet, and the event anſwered remarkably to his prediction. He farther obſerved, that the action of Jupiter, in the deſcent of the comet towards its perihelion in 1682, would tend to increaſe the inclination of its orbit; and accordingly the inclination in 1682 was found to be 22′ greater than in 1607. A learned profeſſor (Dr. Long's Aſtronomy, p. 562) in Italy to an Engliſh gentleman writers thus: "Though M. de la Lande, and ſome other French gentlemen, have taken occaſion to find fault with the inaccuracies of Halley's calculation, becauſe he himſelf had ſaid he only touched upon it ſlightly; nevertheleſs they can never rob him of the honour,—Firſt, of finding out that it was one and the ſame comet which appeared in 1682, 1607, 1531, 1456, and 1305. Secondly, of having obſerved that the planet Jupiter would cauſe the inclination of the orbit of the comet to be greater, and the period longer. Thirdly, of having foretold that the return thereof might be retarded till the end of 1758, or the beginning of 1759." From the obſervations of M. Meſſier upon a comet in 1770, M. Edric Profperin, member of the royal academies of Stockholm and Upſal, ſhewed, that a parabolic orbit would not anſwer to its motions, and he recommended it to aſtronomers to ſeek for the elliptic orbit. This laborious taſk M. Lexell undertook, and has ſhewn that an ellipſe, in which the periodic time is about five years and ſeven months, agrees very well with the obſervations. See the Phil. Tranſ. 1779. As the ellipſes which the comets deſcribe are all very eccentric, aſtronomers, for the eaſe of calculation, ſuppoſe them to move in parabolic orbits, for that part which lies within the reach of obſervation, by which they can very accurately find the place of the perihelion, its diſtance from the ſun, the inclination of the plane of its orbit to the ecliptic, and the place of the node.

But, concerning the return of comets, there have been, and ſtill are, different opinions. Sir Iſaac Newton, Flamſtead, Halley, and other Engliſh aſtronomers, ſeem ſatisfied of the return of comets; Caſſini and ſome of the French think it highly probable; but M. de la Hire, and others, oppoſe it. Thoſe on the affirmative ſide ſuppoſe, that the comets deſcribe orbits prodigiouſly eccentric, inſomuch that we can ſee them only in a very ſmall part of their revolution: out of this, they are loſt in the immenſity of ſpace; hid not only from our eyes, but from our teleſcopes: that little part of their orbit next us paſſing ſometimes within thoſe of all the inferior planets. M. Caſſini gives the following reaſons in favour of their return: 1. It is found that they move a conſiderable time in the arch of a great circle, when referred to the fixed ſtars, that is a circle whoſe plane paſſes

paſſes through the centre of the earth; deviating but a little from it chiefly towards the end of their appearance; a deviation however common to them with the planets. 2. Comets, like planets, appear to move ſo much the faſter as they are nearer the earth; and, when they are at equal diſtances from their perigee, their velocities are nearly the ſame. By ſubtracting from their motion the apparent inequality of velocity occaſioned by their different diſtance from the earth, their equal motion might be found: but we ſhould not ſtill be certain that this is their true motion: becauſe they might have conſiderable inequalities, not diſtinguiſhable in that ſmall part of their orbit viſible to us. It is rather probable that their real motion, as well as that of the planets, is unequal in itſelf; and hence we have a reaſon why the obſervations made, during the appearance of a comet, cannot give a juſt period of their revolution. 3. There are no two different planets whoſe orbits cut the ecliptic in the ſame angle, whoſe nodes are in the ſame points of the ecliptic, and have the ſame apparent velocity in their perigee: conſequently, two comets ſeen at different times, yet agreeing in all thoſe three circumſtances, can only be one and the ſame comet. Not that this exact agreement in theſe circumſtances is abſolutely neceſſary to determine their identity: for the moon herſelf is irregular in all of them, ſo that it ſeems there may be caſes in which the ſame comet, at different periods of revolution, may diſagree in theſe points.

As to the objections againſt the return of comets, the principal is that of the rarity of their appearance, with regard to the number of revolutions aſſigned to them. In 1702 there was a comet, or rather the tail of one, ſeen at Rome, which M. Caſſini takes to be the ſame with that obſerved by Ariſtotle, and again in the year 1668; which would imply a period of thirty-four years. Now, it may ſeem ſtrange that a ſtar which has ſo ſhort a revolution, and of conſequence ſuch frequent returns, ſhould be ſo ſeldom ſeen. Again, in April of the ſame year 1702, a comet was obſerved by Meſſrs. Bianchini and Maraldi, which the latter ſuppoſed was the ſame with that of 1664, both on account of his motion, velocity, and direction. M. de la Hire thought it had ſome relation to another he had obſerved in 1698, which Caſſini refers to that of 1652; which would make it a period of forty-three months, and the number of revolutions, between 1652 and 1692, fourteen. Now, it is hard to ſuppoſe, that in this age, when the heavens are ſo narrowly watched, a ſtar ſhould make fourteen revolutions unperceived; eſpecially ſuch a ſtar as this, which might appear above a month together; and conſequently be often diſengaged from the crepuſcula. For this reaſon M. Caſſini is very reſerved in maintaining the hypotheſis of the return of comets, and only propoſes thoſe for planets where the motions are eaſy and ſimple, and are ſolved without ſtraining, or allowing any irregularities.

M. de la Hire propoſes one general difficulty againſt the whole ſyſtem of the return of comets, which would ſeem to prevent any comet from returning as a planet: which is this; that, by the diſpoſition neceſſarily given to their courſes, they ought to appear as ſmall at firſt as at laſt; and always increaſe till they arrive at their neareſt proximity to the earth; or, if they ſhould not chance to be obſerved as ſoon as they are capable of being ſeen, it is yet hardly poſſible but they muſt often ſhew themſelves before they have arrived at their full magnitude and brightneſs: but, adds he, none were ever

yet observed till they had arrived at it. However, the appearance of a comet in the month of October 1723, while at a great distance, so as to be too small and dim to be viewed without a telescope, as well as the observations of several others since, may serve to remove this obstacle, and set the comets still on the same footing with the planets; or at least to support the prevalent opinion, that the revolution or return of the comets is certain. In short, the best way to ascertain the fact seems to be, to compare the elements of all those comets which have been computed, and, where we find they agree, we may conclude that they are elements of the same comet, it being so extremely improbable that the orbits of two different comets should have the same inclination, the same perihelion distance, and the places of the perihelion and node the same. Thus, knowing the periodic time, we may find the major axis of the ellipse; and, the perihelion distance being known, the minor axis will be known. When the elements of the orbits agree, the comets may be the same, although the periodic times should vary; as that may arise from the attraction of the bodies in our system, and which may also alter all the other elements a little. We have already observed, that the comet which appeared in 1759 had its periodic time increased considerably by the attraction of Jupiter and Saturn. This comet was seen in 1682, 1607, and 1531, all the elements agreeing, except a little variation of the periodic time. Dr. Halley suspected the comet in 1680 to have been the same which appeared in 1106, 531, and forty-four years before Christ. He also conjectured, that the comet observed by Apian in 1532, was the same as that observed by Hevelius in 1661; if so, it ought to have returned in 1790, but it has never been observed. But M. Mechain having collected all the observations in 1532, and calculated the orbit again, found it to be sensibly different from that determined by Dr. Halley, which renders it very doubtful whether this was the comet which appeared in 1661; and this doubt is increased by its not appearing in 1790. The comet in 1770, whose periodic time M. Lexell computed to be five years and seven months, has not been observed since. There can be no doubt but that the path of this comet, for the time it was observed, belonged to an orbit whose periodic time was that found by M. Lexell, as the computations for such an orbit agreed so very well with the observations. But the revolution was probably longer before 1770; for, as the comet passed very near to Jupiter in 1767, its periodic time might be sensibly increased by the action of that planet; and, as it has not been observed since, we may conjecture, with M. Lexell, that, having passed in 1772 again into the sphere of sensible attraction of Jupiter, a new disturbing force might probably take place, and destroy the effect of the other. According to the above elements, the comet would be in conjunction with Jupiter on August 23, 1779, and its distance from Jupiter would be only $\frac{1}{491}$ of its distance from the sun, consequently the sun's action would be only $\frac{1}{224}$ times that of Jupiter. What a change must this make in the orbit! If the comet returned to its perihelion in March 1776, it would then not be visible. See M. Lexell's account in the Phil. Trans. 1779. The elements of the orbits of the comets in 1264 and 1556 were so nearly the same, that it is very probable it was the same comet; if so, it might be expected to appear again about the year 1848.

Sir

Sir Isaac Newton conjectures, that, as those planets which are nearest to the sun, and revolve in the least orbits, are the smallest; so, among the comets, such as in their perihelion come nearest the sun are the smallest, and revolve in the least orbits. As to their apparent velocity, the comet of 1472, as observed by Regiomontanus, was such as to carry it through forty degrees of a great circle in twenty-four hours; and it was observed, that the comet of 1770 moved through more than forty-five degrees in the last twenty-five hours. M. Facio has suggested, that some of the comets have their nodes so very near the annual orbit of the earth, that, if the earth should happen to be found in that part next the node at the time of a comet's passing by; as the apparent motion of a comet will be immensely swift, so its parallax will become very sensible; and its proportion to that of the sun will be given: whence, such transits of comets will afford the best means of determining the distance between the earth and sun. The comet of 1472, for instance, had a parallax above twenty times greater than the sun's: and, if that of 1618 had come down in the beginning of March to its descending node, it would have been much nearer the earth, and its parallax much more notable. But hitherto none has threatened the earth with a nearer appulse than that of 1680: for Dr. Halley finds, by calculation, that November 11, at 1h. 6'. after noon, that comet was not more than one semidiameter of the earth to the northward of the earth's path; at which time, had the earth been in that of its orbit, the comet would have had a parallax equal to that of the moon. What might have been the consequence of so near an appulse is at best uncertain. Mr. Whiston attributes the universal deluge in the time of Noah to the near approach of a comet. His opinion was, that the earth, passing through the atmosphere of the comet, attracted therefrom great part of the water of the flood; that the nearness of the comet raised a great tide in the subterraneous waters, so that the outer crust of the earth was changed from a spherical to an oval figure; that this could not be done without making fissures and cracks in it, through which the waters forced themselves, by the hollow of the earth being changed into a less capacious form; that, along with the water thus squeezed up on the surface of the earth, much slime or mud would rise; which, together with the grosser part of the comet's atmosphere, would, after the subsiding of the water partly into the fissures and partly into the lower parts of the earth to form the sea, cover all over, to a considerable depth, the antediluvian earth. Thus he accounts for trees and bones of animals being found at very great depths in the earth. He also held that, before the fall, the earth revolved round the sun in the plane of the ecliptic, keeping always the same points of its surface towards the same fixed stars. By this means, as every meridian would come to the sun but once in every revolution, a day and a year were then the same: but that a comet, striking obliquely upon some part of the earth, gave it the diurnal rotation; that the antediluvian year consisted of 360 days; but, that the additional matter deposited upon the earth from the atmosphere of the comet at the flood, so retarded the revolution thereof round the sun, that it is not now performed in less than 365 days and about a quarter. The same comet he thought would probably, coming near the earth when heated in an immense degree in its perihelion, be the instrumental cause of that

great cataſtrophe, the general conflagration, foretold in the ſacred writings, and conjectured from ancient tradition.

That this is very poſſible, admits not of a doubt; for, the heat of the comet of 1680, was to the heat of the ſummer ſun as 28,000 to 1. The heat of boiling water is about three times greater than the heat which dry earth acquires from the ſummer ſun: and the heat of red-hot iron about three or four times greater than the heat of boiling water. Therefore the heat of dry earth at the comet, when in its perihelion, was about 2000 times greater than red-hot iron. This heat of the comet muſt alſo be capable of being retained a very long time. For a red-hot globe of iron, of an inch diameter, expoſed to the open air, ſcarcely loſes all its heat in an hour; but a greater globe will retain its heat longer, in proportion to its diameter, becauſe the ſurface, at which it grows cold, varies in that proportion leſs than the quantity of hot matter. Therefore a globe of red-hot iron, as big as our earth, would ſcarcely cool in fifty thouſand years!

From the beginning of our era to this time, it is probable, according to the beſt accounts, that there have appeared about 500 comets. Before that time about 100 others are recorded to have been ſeen, but it is probable that not above half of them were comets. And, when we conſider, that many others may not have been perceived, from being too near the ſun, from appearing in moon-light, from being in the other hemiſphere, from being too ſmall to be perceived, or which may not have been recorded, we might imagine the whole number to be conſiderably greater; but it is likely, that, of the comets which are recorded to have been ſeen, the ſame may have appeared ſeveral times, and therefore the number may be leſs than is here ſtated. The comet in 1786, which appeared on Auguſt 1, was diſcovered by Miſs Caroline Herſchel, a ſiſter of Dr. Herſchel; and ſince that time ſhe has diſcovered three others. A comet was alſo diſcovered at Paris, by M. Bouvard, on Aug. 14, 1797, which was ſeen in England, on the 18th of the ſame month, by the Hon. Capel Loft, of Froſton, in Suffolk, and an account was given of it as follows: It was ſeen at half paſt eight in the evening, nearly in the pole of the ecliptic; compoſing a rhomboides or lozenge-ſhaped figure with β and γ Draconis, and a ſtar of the 4th magnitude in the left heel of Hercules. It was then diſtinctly viſible to the naked eye as a faint ſtar. With a good teleſcope, it appeared to moſt advantage when a power of about forty was uſed. It was then a diffuſed milky hazineſs, like the nebula of Andromeda. Its motion in twenty-four hours was about twelve degrees. It had no diſtinct nucleus; but its ſouthern ſide was moſt luminous, and ſeveral ſtars were ſeen diſtinctly through it. On the 26th at 8h. 53′ it was above α Ophinchi, with four degrees greater altitude than that ſtar; the comet being 50° 5′. It had ſeventy-three degrees polar diſtance, and was very near an unnamed ſtar, from which it was paſſing ſouth-eaſt. Its right aſcenſion twenty degrees of Sagittarius. In paſſing near its node it came very near to the earth, and, when firſt ſeen, it was returning from the ſun, having paſſed its perihelion ſome weeks. Its aſcending node is calculated in the ſign twenty-eight degrees of Aquarius, and its perihelion diſtance computed at near one-ſixteenth of the earth's, conſequently nearer to the ſun than Venus. If the comet was, when neareſt to the earth, on the 16th of Auguſt, about five or ſix millions of miles from us, or more than

than twenty times the moon's diſtance, which appears to have been the caſe, its obſerved apparent diameter could hardly be leſs than one-third larger that the moon. This would make it about 3000 miles in diameter, and ſomewhat conſiderably larger than Mercury. If the perihelion place could be reconciled, the other elements would bring this comet to a very near agreement with that of 1596 and 1699, ſo as to make it probable they might be one and the ſame. This would give a period varying from 103½ to 108½ years.

From what has been diſcovered in general concerning comets, it is poſſible they may ſometimes approach ſo near to the primary planets, as to cauſe an eclipſe of the ſun to thoſe planets; and, as the body of a comet bears a much larger proportion to the bulk of a primary planet than any ſecondary, it is plain that a cometary eclipſe would both be of much longer continuance, and attended with much greater darkneſs, than that occaſioned by the moon; and, if we ſuppoſe the primary planet and comet to be moved both the ſame way, the duration of ſuch an eclipſe would be prodigiouſly lengthened; and thus, inſtead of four minutes, the ſun might be totally darkened to the inhabitants of certain places for as many hours. Hence we may account for that prodigious darkneſs which we ſometimes read of in hiſtory, at times when no eclipſe of the ſun by the moon could poſſibly happen. Such are thoſe mentioned by Herodotus, lib. viii. c. 37, and lib. ix. c. 70; likewiſe the eclipſe mentioned by Dion, which happened a little before the death of Auguſtus; and it is obſervable, that Seneca noticed a comet the ſame year. It is remarkable, however, that no comet hath ever been obſerved paſſing over the diſk of the ſun like a ſpot, as Venus and Mercury are; yet this muſt certainly happen, when the comet is in its perihelion, and the earth on the ſame ſide of its annual orbit. Such a phenomenon well deſerves the watchful attention of aſtronomers, as it would be a a greater confirmation of the planetary nature of the comets than any thing hitherto obſerved.

THE LAND OF PHILOSOPHERS.

[From the ITER SUBTERRANEUM of KLIMIUS.]

THIS land is named ſo by its inhabitants, who are wholly immerſed in ſtudious and philoſophical reſearches. I was very eager to ſee a country which I repreſented to myſelf as the centre of all the ſciences, and the real ſeat of the muſes. Full of this I haſtened forwards, thinking every moment an hour: the paths I had to paſs were full of ſtones, impeded with holes and deep pits; ſometimes I was up to the waiſt in the mire; there were no bridges, and I dragged my clogged and wounded feet with difficulty along: but to all theſe troubles I ſubmitted with great reſolution, well-knowing we muſt firſt ſubmit to pain, to get at pleaſure; having ſtruggled with my fatigue for the ſpace of an hour, I met a countryman, whom addreſſing civilly, I aſked him how far I might be from the Land of Philoſophers? "You had better enquire," ſaid he, "how far it is to the extremity of it, for you are now in the middle of the country." Full of aſtoniſhment, "How happens it," returned I, "that a land, inhabited by philoſophers only, ſhould exhibit an appearance of rudeneſs and deſolation, rather than of culture?" He anſwered, "that

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the face of the country would foon be improved, if once the inhabitants could get leifure from bufinefs of fuperior importance. At prefent," he continued, "they are all employed upon celeftial matters; namely, in difcovering a way to the fun; they may well therefore be excufed, if for awhile they leave their fields uncultivated, for it is not eafy at the fame time to fly and to creep." I foon found out what the fhrewd countryman meant to infinuate, and, purfuing my journey, I came at length to Cafka, the principal city. At the gates, inftead of centinels, I obferved geefe, hens, and chickens, a multitude of birds nefts and fpiders webs. In the ftreets I faw pigs and philofophers wandering promifcuoufly together, diftinguifhed only by the fhapes of their bodies, being perfectly alike as to filth and dirt. The philofophers had all a veft of the fame fhape, but what its colour was, no one could tell, it was fo fmeared with all manner of naftinefs: I faid to one of them, who abforbed in meditation was advancing towards me, "Pray, fir, what is the name of this city?" He, without moving his eyes or ftirring a limb, ftood ftill, as if his foul had been totally abftracted from his body; at length raifing his eyes flowly to the fkies, he returned, "I think it is almoft noon." So abfurd an anfwer, indicating a mind totally deranged, induced me to think it were better to ftudy rather too little, than to be mad from excefs of learning. I proceeded to examine the interior parts of the city, wifhing to know, whether befides thefe philofophers, I could find fome rational beings. I found the great fquare very commodious, full of ftatues and columns, on which were various infcriptions; I went up to one of them, intending to try if I could make out what was written; as I ftood in this pofture, I found on a fudden my back become very warm and wet: turning round, that I might get rid of this warm ftream, I obferved a philofopher making water upon me: loft in thought, he fuppofed me to be a ftatue, againft which he might eafe nature. Angry at fo grofs an infult, and ftill more fo when I perceived the philofopher grinning at me, as if in fcorn, I gave him a found box on the ear; at which, in a great rage, he caught me by the hair, and dragged me bawling round the fquare; but, when I found his refentment ftill unappeafed, I determined to refift, and give him as good as he brought, fo that the account betwixt us was tolerably equal: after a fharp conteft, we both fell down; a crowd of philofophers ran up to us, attacking me with their fifts and fticks in a furious manner, and dragged me half dead round the fquare by my hair; tired at length, but not fatisfied, they led me to a large building; I placed my feet againft the door, and ftoutly refufed to enter; but feizing me by the neck, bellowing like a boar, they thruft me in, and threw me fprawling on the ground; I then began to entreat their wifdoms in a moft fuppliant tone, to moderate their anger, and give place to pity, urging how inconfiftent it was with thofe who ftudied wifdom and philofophy, to imitate the fury of wild beafts, and to indulge thofe paffions againft the excefs of which they ferioufly declaimed. They turned a deaf ear to me, and the philofopher who firft affronted me renewed his blows, beating me as if I had been an anvil, and as if nothing fhort of my death could pacify him. Thus I was taught that no anger exceeds that of philofophers, and that commenting upon virtue was very different from practifing it. At length four philofophers entered the apartment, whofe drefs indicated a different fect; by their interpofing partly with

with words, and partly with perſonal exertions, they appeared to pity my condition; and, often talking apart with the reſt, they removed me to another dwelling. Great was my exultation at being delivered from the hands of aſſaſſins, and meeting with honeſt men; on their enquiring about what had happened, I told them every particular: they ſmiled at the humour of the accident, remarking that it was uſual for philoſophers, when walking in the great ſquare, ſo to uſe the ſtatues, for one of which my opponent, loſt in profound meditation, miſtook me: they added that he was an aſtronomer of high reputation, and that the others, who had beaten me with ſuch rage and virulence, were teachers of moral philoſophy! I thought myſelf arrived at a ſafe port, and, free from all apprehenſions, I liſtened to them, telling me theſe and many other things, with great delight: I began at length to have ſome ſuſpicion from their minute examination of my perſon; neither did I like their queſtions concerning my manner of life, the occaſion of my travels, my country, all which, again and again repeated, together with their frequent whiſpers, I conſidered as bad omens; but I was almoſt overpowered with terror, when I was carried to an anatomical theatre, where I beheld fragments of bones and carcaſes ſcattered about, filling all the place with a moſt offenſive ſtench. I at firſt ſuppoſed myſelf in a den of robbers, but my fears were ſomewhat alleviated by the anatomical inſtruments ſuſpended from the walls, which made it ſufficiently obvious that my hoſt was either a ſtudent of medicine or practitioner of ſurgery. After I had been left to my private meditations in this place for the ſpace of about half an hour, an elderly woman entered with the dinner ſhe had provided for me; ſhe ſeemed particularly humane, contemplating me with great attention, and at intervals ſighing very deeply: upon my aſking her the cauſe of her uneaſineſs, ſhe replied, that it was my impending fate which provoked her ſighs. "This is an honourable place indeed that you are come to," ſhe continued. "My huſband is the principal perſonage of this city, he is the public phyſician and a teacher of medicine; thoſe you ſaw with him are his colleagues: aſtoniſhed at the unuſual ſtructure of your perſon, they have determined to diſſect you, in order to examine your interior parts, and hoping to make ſome diſcovery which may extend the ſcience of anatomy." Theſe words ſtruck horror to my ſoul. "And can theſe," cried I, "be called worthy men, who without ſcruple can cut to pieces an helpleſs and unoffending individual?" Then falling upon my knees at her feet, I implored her with tears to intercede for me. "My interceſſion," ſhe replied, "would be of little avail againſt a decree of the faculty; however I will endeavour at leaſt that you may not loſe your life in this manner." Saying this, ſhe took me by the hand, and, leading me by a falſe paſſage, ſhe conducted me, trembling like a leaf, to the gates of the city. I then turned to my benefactreſs, endeavouring to expreſs my gratitude in ſome well-adapted expreſſions, but ſhe avowed herſelf determined not to quit me till ſhe ſaw me in a place of perfect ſafety; ſhe then proceeded to accompany me, not at all reluctant. As we walked on together, we had various diſcourſe on the ſubject of the country, to which I liſtened with great avidity; ſhe at length introduced a converſation by no means of an agreeable nature, becauſe it compelled me to conclude that ſhe expected a compenſation totally inconſiſtent with good morals: ſhe expatiated

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with much sensibility on the unjust condition of wives in this country, since these philosophical pedagogues, buried as it were in learning, neglected their domestic duties. "I could safely swear," said she, "that we should be totally undone, if now and then an honest and compassionate stranger did not pity our misfortunes." I pretended not to understand the mark at which she aimed; I hastened my pace, but my coldness increased her warmth; at length in plain terms, she reproached me with ingratitude; I nevertheless continued to proceed, till, taking hold of my garments, she endeavoured forcibly to detain me; thus obliged to exert myself, I forced myself from her, and, my exertions giving wings to my feet, I was very soon out of sight.

OF THE ORIGIN AND USE OF BELLS.

UPON the origin of church-bells, Mr. Whitaker, in his History of Manchester, observes, That bells being used, among other purposes, by the Romans, to signify the times of bathing, were naturally applied by the Christians of Italy to denote the hours of devotion, and summon the people to church. The first application of them to this purpose is, by Polydore Virgil and others, ascribed to Paulinus bishop of Nola, a city of Campania, about the year 400. Hence, it is said, the names *nolæ* and *campanæ* were given them; the one referring to the city, the other to the country. Though others say they took the latter of these names, not from their being invented in Campania, but because it was here the manner of hanging and balancing them, now in use, was first practised; at least that they were hung on the model of a sort of balance invented or used in Campania; for in Latin writers we find *campana statera*, for a steelyard; and in the Greek καμπανίζειν, and *ponderare*, "to weigh." Bells, on their first introduction into the church, were called *saints*; hence *toc-saint*, or *toc-sin*, the corruption which in process of time followed. Pliny reports, that many ages before his time, bells were in use, and called *tintinnabulæ*; and Suetonius says, that Augustus had one put at the gate of the temple of Jupiter to call the meeting of the people. In Britain, bells were applied to church-purposes, before the conclusion of the seventh century, in the monastic societies of Northumbria, and as early as the sixth even in those of Caledonia. And they were therefore used from the first erection of parish-churches among us.—Those of France and England appear to have been furnished with several bells. In the time of Clotaire II. king of France, and in the year 610, the army of that king was frightened from the siege of the city of Sens, by ringing the bells of St. Stephen's church. The second excerption of Egbert, about the year 750, which is adopted in a French Capitulary of 801, commands every priest, at the proper hours, to sound the bells of his church, and then to go through the sacred offices to God. And the council of Enham, in 1011, requires all the mulcts for sins to be expended in the reparation of the church, the purchase of church-vestments, and church-bells. These were sometimes composed of iron in France; and in England, as formerly at Rome, were frequently made of brass. And as early as the ninth century, there were many cast of a large size and deep note.

 Ingolphus

Ingolphus mentions, that Turketulus abbot of Croyland, who died about the year 870, gave a great bell to the church of that abbey, which he named *Guthlac*; and afterwards six others, viz. two which he called *Bartholomew* and *Bettelin*, two called *Turketul* and *Tatwin*, and two named *Pega* and *Bega*, all which rang together; the same author says, *Non erat tunc tanta consonantia campanarum in tota Anglia*. Not long after, Kinseus archbishop of York gave two great bells to the church of St. John at Beverly, and at the same time provided that other churches in his diocese should be furnished with bells. Mention is made by St. Aldhem, and William of Malmesbury, of bells given by St. Dunstan to the churches in the west. The number of bells in every church gave occasion to the curious and singular piece of architecture in the campanile or bell-tower; an addition, which is more susceptible of the grander beauties of architecture than any other part of the edifice, and is generally therefore the principle or rudiments of it. It was the constant appendage to every parish-church of the Saxons, and is actually mentioned as such in the laws of Athelstan.

The Greek Christians are usually said to have been unacquainted with bells till the ninth century, when their construction was first taught them by a Venetian. Indeed, it is not true that the use of bells was entirely unknown in the ancient eastern churches, and that they called the people to church, as at present, with wooden mallets. Leo Alatius, in his dissertations on the Greek temples, proves the contrary from several ancient writers. It is his opinion, that bells first began to be disused among them after the taking of Constantinople by the Turks; who, it seems, prohibited them lest their sound should disturb the repose of souls, which, according to them, wander in the air. He adds, that they still retain the use of bells in places remote from the intercourse of the Turks; particularly, very ancient ones in Mount Athos. F. Simon thinks the Turks prohibited the Christians the use of bells, rather out of political than religious reasons; inasmuch as the ringing of bells might serve as a signal for the execution of revolts, &c.

In the ancient monasteries we find six kinds of bells enumerated by Durandus, viz, *Squilla*, rung in the refectory; *cymbalum*, in the cloister; *nola*, in the choir; *nolula* or *dupla*, in the clock; *campana*, in the steeple; and *signum* in the tower. Belethus has much the same; only that for *squilla*, he puts *tintinnabulum*, and places the *campana* in the tower, and *campanella* in the cloister. Others place the *tintinnabulum* or *tinniolum*, in the refectory or dormitory; and add another bell called *corrigiuncula*, rung at the time of giving discipline, to call the monks to be flogged. The *cymbalum* is sometimes also said to have been rung in the cloister, to call the monks to meat. In the funeral monuments of Weever, are the following particulars relating to bells: "Bells had frequently these inscriptions on them:

> "Funera plango, Fulgura frango, Sabbata pango,
> Excito lentos, Dissipo ventos, Paco cruentos.

"In the Little Sanctuary at Westminster King Edward III. erected a clochier, and placed therein three bells for the use of St. Stephen's chapel: about the biggest of them were cast in the metal these words:

> "King Edward made mee thirtie thousand weight and three,
> Take me down and wey me, and more you shall fynd me.

 "But

" But theſe bells being to be taken down in the reign of King Henry VIII. one writes underneath with a coale :

> " But Henry the eight
> Will bait me of my weight." *Ibid.* 492.

This laſt diſtich alludes to a fact mentioned by Stow in his Survey of London, ward of Farringdon Within, to wit, that near to St. Paul's ſchool ſtood a clochier, in which were four bells called *Jeſus's bells*, the greateſt in all England, againſt which Sir Miles Partridge ſtaked an hundred pounds, and won them of King Henry VIII. at a caſt of dice. Neverthelefs it appears that abroad there are bells of greater magnitude. In the ſteeple at the great church at Roan in Normandy is a bell with this inſcription :

> *Je ſuis George d'Ambois,*
> *Qui trente cinque mille pois.*
> *Mes lui qui me peſera,*
> *Trente ſix mille me trouera.*

> I am George of Ambois,
> Thirtie five thouſand in pois :
> But he that ſhall weigh me,
> Thirtie ſix thouſand ſhall find me. *Ibid.*

And it is a common tradition that the bells of King's-college chapel, in the univerſity of Cambridge, were taken by Henry V. from ſome church in France, after the battle of Agincourt. They were taken down ſome years ago, and ſold to Phelps the bell-founder in White-chapel. The uſes of bells were ſummed up in the following diſtich, as well as that firſt above mentioned :

> Laudo Deum verum, plebem voco, conjugo clerum,
> Defunctos ploro, peſtem fugo, feſta decoro.

Matthew Paris obſerves, that anciently the uſe of bells was prohibited in time of mourning ; though at preſent they make one of the principal ceremonies of mourning. Mabillon adds, that it was an ancient cuſtom to ring the bells for perſons about to expire, to advertiſe the people to pray for them ; whence our paſſing-bells. The paſſing bell, indeed, was anciently rung for two purpoſes : one, to beſpeak the prayers of all good Chriſtians for a ſoul juſt departing ; the other, to drive away the evil ſpirits who ſtood at the bed's foot, and about the houſe, ready to ſeize their prey, or at leaſt to moleſt and terrify the ſoul in its paſſage : but by the ringing of that bell (for Durandus informs us, evil ſpirits are much afraid of bells), they were kept aloof ; and the ſoul, like a hunted hare, gained the ſtart, or had what is by ſportſmen termed *law*. Hence, perhaps, excluſive of the additional labour, was occaſioned the high price demanded for tolling the greateſt bell of the church ; for, that being louder, the evil ſpirits muſt go farther off to be clear of its ſound, by which the poor ſoul got ſo much more the ſtart of them : beſides, being heard farther off, it would likewiſe procure the dying man a greater number of prayers. This diſlike of ſpirits to bells is mentioned in the Golden Legend, by W. de Worde. " It is ſaid, the evill ſpirytes that ben in the regyon of thayre, doubte moche when they here the belles rongen : and this is the cauſe why the belles ben

rongen

rongen whan it thondreth, and whan grete tempeſte and outrages of wether happen, to the ende that the feinds and wycked ſpirytes ſhold be abaſhed and flee, and ceaſe of the movynge of tempeſte." Lobinean obſerves, that the cuſtom of ringing bells at the approach of thunder, is of ſome antiquity; but that the deſign was not ſo much to ſhake the air, and ſo diſſipate the thunder, as to call the people to church to pray that the pariſh might be preſerved from that terrible meteor.

In the Romiſh church, bells were baptized and anointed *oleo Chriſmatis*: they were exorciſed, and bleſſed by the biſhop; from a belief, that, when theſe ceremonies were performed, they had power to drive the devil out of the air, to calm tempeſts, to extinguiſh fire, and to recreate even the dead. The ritual for theſe ceremonies is contained in the Roman pontifical; whence the origin of giving to bells the name of ſome ſaint. In Chauncey's Hiſtory of Hertfordſhire, page 383, is a relation of the baptiſm of a ſet of bells in Italy with great ceremony, a ſhort time before the writing that book. The bells of the pariſh-church of Winnington in Bedfordſhire had their names caſt about the verge of every one in particular, with theſe rhiming hexameters:

Nomina Campanis hæc indita ſunt quoque noſtris.
1. Hoc ſignum Petri pulſatur nomine Chriſti.
2. Nomen Magdalene campana ſonat melode.
3. Sit nomen Domini benedictum ſemper in evum.
4. Muſa Raphaelis ſonat auribus Immannuelis.
5. Sum Roſa pulſata mundique Maria vocata. *Weev. Fun.* 122.

By an old chartulary, once in the poſſeſſion of Weever the antiquary, it appears that the bells of the priory of Little Dunmow in Eſſex were, anno 1501, new caſt, and baptized by the following names;

Prima in honore Sancti Michaelis Archangeli.
Secunda in honore S. Johannis Evangeliſti.
Tertia in honore S. Johannis Baptiſti.
Quarta in honore Aſſumptionis beatæ Mariæ.
Quinta in honore ſancti Trinitatis, et omnium ſanctorum. *Ib.* 633.

The bells of Oſney abbey near Oxford were very famous; their ſeveral names were Douce, Clement, Auſtin, Hautecter [potius Hautcleri], Gabriel, and John.

The Ruſſians, it is ſaid, have a great paſſion for bell-ringing; and we are told, that the great bell of Moſcow, weighs, according to Mr. Coxe, "432,000 pounds, and which exceeds in bigneſs every bell in the known world. Its ſize is ſo enormous, that I could ſcarcely have given credit to the account of its magnitude, if I had not examined it myſelf, and aſcertained its dimenſions with great exactneſs. Its height is nineteen feet, its circumference at the bottom twenty-one yards eleven inches, its greateſt thickneſs twenty-three inches." It was caſt in the reign of the empreſs Anne; but, the beam on which it hung being burnt, it fell, and a large piece is broken out of it; ſo that it lately lay in a manner uſeleſs. Mr. Bruce, in his late memoirs, mentions a bell at Moſcow, founded in czar Boris's time, nineteen feet high, twenty-three in diameter, and two in thickneſs, that weighed 336,000 pounds.

Nankin in China was anciently famous for the largeneſs of its bells: but their enormous weight brought down the tower, the whole

whole building fell to ruin, and the bells have ever ſince lain on the ground. One of theſe bells is near twelve Engliſh feet high, the diameter ſeven and a half, and its circumference twenty-three; its figure almoſt cylindric, except for a ſwelling in the middle; and the thickneſs of the metal about the edges ſeven inches. From the dimenſions of this bell, its weight is computed at 50,000 pounds, which is more than double the weight of that of Erfort, ſaid by Father Kircher to be the greateſt bell in the world. Theſe bells were caſt by the firſt emperor of the preceding dynaſty, about 300 years ago. They have each their name; the hanger *(tchoui)*, the eater *(che)*, the ſleeper *(choui)*, the will *(ſi)*. Father le Compte adds, that there are ſeven other bells in Pekin, caſt in the reign of Youlo, each of which weighs 120,000 pounds. But the ſounds even of their biggeſt bells are very poor; being ſtruck with a wooden in lieu of an iron clapper.

The practice of ringing bells in change, or regular peals, is ſaid to be peculiar to England; whence Britain has been termed the *ringing iſland.* The cuſtom ſeems to have commenced in the time of the Saxons, and was common before the conqueſt. The ringing of bells, though a recreation chiefly of the lower ſort, is in itſelf not incurious. The tolling a bell is nothing more than the producing a ſound by a ſtroke of the clapper againſt the ſide of the bell, the bell itſelf being in a pendant poſition and at reſt. In ringing, the bell, by means of a wheel and a rope, is elevated to a perpendicular: in its motion to this ſituation, the clapper ſtrikes forcibly on one ſide, and in its return downwards on the other ſide of the bell, producing at each ſtroke a ſound. There are in London ſeveral ſocieties of ringers, particularly one known by the name of the *College Youths*: of this it is ſaid Sir Matthew Hale, lord chief juſtice of the court of King's Bench, was, in his youthful days, a member; and in the life of this learned and upright judge, written by Biſhop Burnet, ſome facts are mentioned which favour this relation. In England the practice of ringing is reduced to a ſcience, and peals have been compoſed which bear the name of their inventors. Some of the moſt celebrated peals now known were compoſed about fifty years ago by one Patrick. This man was a maker of barometers: in his advertiſements he ſtyled himſelf *Torricellian Operator*, from Torricelli, who invented inſtruments of this kind. In the year 1684, Abraham Rudhall, of the city of Glouceſter, brought the art of bell-founding to great perfection. His deſcendants in ſucceſſion have continued the buſineſs of caſting bells; and by a liſt publiſhed by them it appears, that at Lady-day 1774 the family, in peals and odd bells, had caſt to the amount of 3594. The peals of St. Dunſtan's in the Eaſt, and St. Bride's, London, and St. Martin's in the Fields, Weſtminſter, are in the number. The muſic of bells is altogether melody; but the pleaſure ariſing from it conſiſts in the variety of interchanges, and the various ſucceſſion and general predominance of the conſonances in the ſounds produced. Muſical authors however, have written but little upon this ſubject.

The ſound of a bell is conjectured to conſiſt in a vibratory motion of its parts, much like that of a muſical chord. The ſtroke of the clapper muſt neceſſarily change the figure of the bell, and of a round make it oval; but, the metal having a great degree of elaſticity, that will

will return back again which the ftroke drove fartheft off from the centre, and that even fome fmall matter nearer the centre than before; fo that the two parts which before were extremes of the longeft diameter, do then become thofe of the fhorteft; and thus the external furface of the bell undergoes alternate changes of figure, and by that means gives that tremulous motion to the air in which the found confifts. M. Perrault maintains, that the found of the fame bell or chord is a compound of the founds of the feveral parts thereof; fo that where the parts are homogeneous, and the dimenfions of the figure uniform, there is fuch a perfect mixture of all thefe founds as conftitutes one uniform, fmooth, even, found; and the contrary circumftances produce harfhnefs. This he proves from the bells differing in tone according to the part you ftrike; and yet, ftrike it any where, there is a motion of all the parts. He therefore confiders bells as a compound of an infinite number of rings, which according to their different dimenfions have different tones, as chords of different lengths have; and, when ftruck, the vibrations of the parts immediately ftruck determine the tone, being fupported by a fufficient number of confonant tones in the other parts. Bells are obferved to be heard farther placed on plains than on hills; and ftill farther in valleys than on plains: the reafon of which will not be difficult to affign, if it be confidered, that, the higher the fonorous body is, the rarer is its medium: confequently, the lefs impulfe it receives, and the lefs proper vehicle it is to convey it to a diftance.

Mr. Reaumur, in the Memoirs of the Paris Academy, has the following obfervations relating to the fhape moft proper for bells, to give them the loudeft and cleareft found. He obferves, "that as pots and other veffels more immediately neceffary to the fervice of life were doubtlefs made before bells, it probably happened that the obferving thefe veffels to have a found when ftruck, gave occafion to making bells, intended only for found, in that form; but, that it does not appear that this is the moft eligible figure; for lead, a metal which is in its common ftate not at all fonorous, yet becomes greatly fo on its being caft into a particular form, and that very different from the common fhape of bells. In melting lead for the common occafions of cafting in fmall quantities, it is ufually done in an iron ladle: and, as the whole is feldom poured out, the remainder, which falls to the bottom of the ladle, cools into a mafs of the fhape of that bottom. This is confequently a fegment of a fphere, thickeft in the middle, and thinner towards the edges; nor is the ladle any neceffary part of the operation, fince, if a mafs of lead be caft in that form in a mould of earth or fand, in any of thefe cafes it is found to be very fonorous. Now, if this fhape alone can give found to a metal which in other forms is perfectly mute, how much more muft it neceffarily give it to other metals naturally fonorous in whatever form? It fhould feem, that bells would much better perform their office in this than in any other form: and that it muft particularly be a thing of great advantage to the fmall bells of common houfe-clocks, which are required to have a fhrill note, and yet are not allowed any great fize." He adds, "that had our forefathers had opportunities of being acquainted with the found of metals in this fhape, we fhould probably have had all our bells at prefent of this form."

The ufe of bells is very ancient, as well as extenfive, both among Jews, Greeks, Romans, Chriftians, and Heathens, varioufly applied;

plied; as on the necks of men, beasts, birds, horses, sheep, &c. Among the Jews it was ordained, that the lower part of the blue tunic which the high-priest wore when he performed religious ceremonies, should be adorned with pomegranates and gold bells, intermixed equally and at equal distances. As to the number of the bells worn by the high priest, the scripture is silent; and authors are not very well agreed: but the sacred historian has let us into the use and intent of them in these words: (Exod. xxviii. 33—35.) "And it shall be upon Aaron to minister, and his sound shall be heard when he goeth into the holy place before the Lord, and when he cometh out, that he die not." The Kings of Persia are said to have the hem of their robes adorned like the Jewish high-priests with pomegranates and gold bells. It was, in the opinion of Calmet, with a design of giving notice that the high-priest was passing by, that he wore little bells on the hem of his robe; or rather it was as it were a kind of public notice that he was going to the sanctuary: for as, in the King of Persia's court, no one was suffered to enter the apartments without giving notice thereof by the sound of something; so the high-priest, out of respect to the divine presence residing in the holy of holies, did, by the sound of little bells fastened to the bottom of his robe, desire as it were permission to enter, that the sound of the bells might be heard, and he not be punished with death for an unmannerly intrusion. The figure of these bells is not known to us. The prophet Zachariah (xiv. 20.) speaks of bells hung to war-horses. "In that day (says the prophet) there shall be upon the bells of horses, Holiness unto the Lord."

Among the Greeks, those who went the nightly rounds in camps or garrisons, carried with them a little bell, which they rung at each centry-box to see that the soldiers on watch were awake. A codonophorous or bell-man also walked in funeral processions, at a distance before the corps, not only to keep off the crowd, but to advertise the *flamen dialis* to keep out of the way, for fear of being polluted by the sight, or by the funerary music. The priest of Proserpine at Athens, called *hierophantus*, rung a bell to call the people to sacrifice. There were also bells in the houses of great men to call up the servants in a morning. Zonara assures us, that bells were hung with whips on the triumphal chariots of their victorious generals, to put them in mind that they were still liable to public justice. Bells were put on the necks of criminals going to execution, that persons might be warned by the noise to get out of the way of so ill an omen as the sight of the hangman or the condemned criminal, who was devoted and just going to be sacrificed to the *dii manes*.

In England, the *curfew*, or evening bell, was established by William the Conqueror, who appointed, under a severe penalty, that, at the ringing of this bell at eight o'clock in the evening, every one should put their fires and candle, and go to bed. It is remarkable, that this institution, though a mark of national disgrace and slavery, is continued in almost every town and city in the kingdom, to the present day. Bells on the necks of brutes, are expressly mentioned in Phædras,—*Celsa cervice eminens, Clarumque collo jactans tintinnabulum*, Taking these bells away was confirmed by the civil law, theft; and, if the beast was lost by this means, the person who took away the bells was to make satisfaction.

ACCOUNT

ACCOUNT OF THE ROCK-SALT AT NORTHWICH, AND THE BRINE-PITS AT DROITWICH.

ROCK-ſalt is found from twenty-eight to forty-eight yards beneath the ſurface of the earth. The firſt ſtratum or mine met with is from fifteen to twenty-one yards in thickneſs, perfectly ſolid, and ſo hard as to be cut with great difficulty with iron picks and wedges. Of late the workmen have blaſted it with gunpowder, by which they looſen and remove many tons together. The appearance of the ſalt is extremely reſembling that of brown ſugar-candy. Beneath this ſtratum is a bed of hard ſtone, conſiſting of large veins of flag, intermixed with ſome rock-ſalt, the whole from twenty-five to thirty-five yards in thickneſs. Under this bed is a ſecond ſtratum, or mine, of ſalt, from five to ſix yards thick, many parts of it perfectly white, and clear as cryſtal, others browner, but all purer than the upper ſtratum, yet reckoned not ſo ſtrong. Above the whole maſs of ſalt lies a bed of whitiſh clay, which has been uſed in the Liverpool earthen ware; and in the ſame place is found a good deal of gypſum, or plaiſter-ſtone.

Rock-ſalt pits are ſunk at great expence, and are very uncertain in their duration, being frequently deſtroyed by the brine ſprings burſting into them, and diſſolving the pillars, by which the whole work falls in, leaving vaſt chaſms on the ſurface of the earth. In forming a pit, a ſhaft or eye is ſunk, ſimilar to that of a coal-pit, but more extenſive. After the workmen have got down to the ſalt-rock, and made a proper cavity, they leave a ſufficient ſubſtance of the rock, about ſeven yards in thickneſs, to form a ſolid roof, and, as they proceed, they hew pillars out of the rock for the ſupport of that roof, and then employ gunpowder to ſeparate what they mean to raiſe. When well illuminated, the cryſtalline ſurface of the roof, pillars, and ſides, of a large pit, make a glittering and magnificent appearance. Freſh air is conveyed from the mouth of the pit by means of a tube, to which is fixed a pair of forge bellows, forming a continual current between the outer air and that in the pit. The pits at the greateſt depth are dry, and of a comfortable temperature.

The largeſt rock-ſalt pit now worked, is in the townſhip of Witton, and in the lands of Nicholas Aſhton, Eſq. It is worked in a circular form, 108 yards in diameter, its roof ſupported by twenty-five pillars, each three yards wide at the front, four at the back, and its ſides extending ſix yards. The pit is fourteen yards hollow; conſequently each pillar contains 294 ſolid yards of rock-ſalt; and the whole area of the pit contains 9160 ſuperficial yards, little leſs than two acres of land.

The average quantity of rock-ſalt annually delivered from the pits in the neighbourhood of Northwich for the laſt ſeven years is 50,484 tons. Another account ſtates the annual average (no period mentioned) at about 65,000 tons. Upon this laſt calculation, the mode in which the rock-ſalt is diſpoſed of is ſtated to be, exported to Dunkirk, Oſtend, Riga, Bruges, Nieuport, Pillau, Elſineur, &c. from 45 to 50,000 tons; ditto to Ireland, from 3000 to 4000 tons; refined in England, at Northwich, 5000 tons; Liverpool, 3000 tons; Frodſham, 3000 tons; Dungeon works, 2500 tons.

The rock-ſalt, as well as the white ſalt, made at Northwich, is conveyed down the Weaver, and thence by the Merſey to Liverpool in veſſels from fifty to eighty tons burthen, and there re-ſhipped for foreign countries, or kept for refinement.

The brine-pits at Droitwich are immenſe, and continually running over, owing to the greatneſs of the ſprings. The brine is ſuppoſed to be the ſtrongeſt ever known, containing about 1-4th ſalt, while thoſe of Nantwich in Cheſhire yield only 1-6th, and thoſe of Weſton in Staffordſhire only 1-9th part. This laſt indeed is the weakeſt brine commonly boiled in England; but in Germany, and other places, where ſalt is ſcarce, they work the ſprings whoſe water is not higher impregnated than common ſea-water, containing about 3-40ths ſalt. Here we may obſerve, that ſea-water, brine-ſprings, and rock-ſalt, generally contain, beſides common ſalt, various other earthy and ſaline ingredients, ſuch as calcareous earth, magneſia, Epſom ſalts, ſelenites, Glauber's ſalts, fixed alkali uncombined with any acid, &c. Theſe ſubſtances are foreign to the nature of ſalt, and injure its quality; and hence it muſt appear, that common ſalt may have very different properties, according to the quality of the water from which it is made, or the ſkill of the ſalt-maker in ſeparating thoſe heterogeneous ſubſtances from it.

At Droitwich the brine is pumped out of the pits chiefly with horſes by engines (though at ſome of the ſmall pits it is pumped up by men) into large reſervoirs, from which there are trees laid to the different ſalt-works; then they have only to turn a large braſs cock to let the brine run into the pans in which it is boiled. Theſe pans are of wrought iron, from fourteen to twenty-four feet long, from twelve to twenty feet wide, and from two to two feet and a half deep. One pan of brine will take about fifteen or twenty hours boiling, and will make from 15 cwt. to one ton of ſalt. The brine regularly boils and ſimmers to ſalt, which falls to the bottom of the pans, and is then raked out and put into wooden barrows or baſkets made oval, then carried into a ſtove to dry, which it does in about forty hours, after which it is fit for uſe.

The following artificial method of promoting the evaporation of ſea-water (when there is not ſufficient heat of weather to perform it quick enough), and to preſerve the brine in the pits from being diluted with rain, is the diſcovery of Dr. Brownrigg, and we hope will not appear miſplaced under this article.—A number of ſalt-pits ſhould be made in a row in the marſh, from eaſt to weſt, and their bottoms lined with plaiſter, or ſome ſtrong cement, that will not eaſily break up; and, by this caution, the ſalt may be drawn white and pure like the Portugal kind, not grey like the French. Over each pit covers ſhould be made of thin boards, or rather of canvas painted white, and ſtretched on frames of wood, and theſe ſhould be fixed to ſtrong poſts, erected on the north ſide of the pits, and contrived to be eaſily drawn back to them, in the manner of draw-bridges. Theſe covers, thus fixed, may be let down over the pits, in manner of a ſhed or penthouſe, in rainy weather, to keep the brine from being diluted with freſh water; and in dry weather they may be raiſed almoſt to a perpendicular, but inclining a little toward the ſouth, ſo as to form a wall with a ſouth aſpect; and thus they would ſerve for a double uſe, being a covering to the pits in rainy weather, and reflectors of the ſun's heat in dry weather. The

reflection

reflection of ſo large a body of the ſun's rays, in the courſe of a bright day, would greatly promote the evaporation of the brine; and the hinges, on which the reflectors turn, being placed at ten inches from the ground, when the reflectors ſtand upright, there will be a ſpace under them, through which the air will continually flow in a briſk current, and this will greatly promote the evaporation of the water.

The paſſages of communication between the pits muſt be narrow and winding, and muſt be wholly ſtopped up in wet weather, that no freſh water run into the brine. This channel ſhould be covered alſo with boards; and, at the entrance of the pits, there muſt not be a pond, as is the cuſtom in France, but only a narrow covered trench, running parallel with the ſide of the pits, which is oppoſite to the reflectors; and the pond, which forms the entrance of the pits in the French ſalt-marſhes, muſt in theſe be detached from them, and inſtead of it there muſt be formed a fourth brine-pond, communicating with the third by a long and narrow channel.

If theſe contrivances ſhould be reduced to practice in England, the ſalt will probably cryſtallize much faſter there than in the French marſhes, and the brine may be kept as deep and even deeper than in the French pits; and a ſhower of rain will only retard the work for the ſmall time in which it is falling: whereas, in the French works, it throws them back three or four days, as no ſalt can be formed till all the water it brought be evaporated.

Four ciſterns may be dug adjoining to the brine-pits, to admit the brine in the ſalt-ponds, when the weather is very rainy; and, as to the ſalt-water in the reſervoir, if it ſhould be found neceſſary to preſerve it from rain in ciſterns, when ſo much rain falls as to make it freſher than ſea-water, it may be let out, and ſea-water admitted in its place. And, in order to promote the evaporation, and to make the ſalt-water in the reſervoir fitter to ſupply the firſt brine-pond with brine of a due ſtrength, it may be proper, by means of a ſmall fire-engine, continually to force up the ſalt-water in the reſervoir, as often as occaſion requires, and, by means of a diverger, fitted to the engine, to make it deſcend again into the reſervoir, like a ſhower of rain; by which means the evaporation of the watery vapours will be greatly promoted, after much the ſame manner as is practiſed at ſeveral of the ſalt-works in Germany, where the brine is very weak.

Thus, by augmenting the force of the ſun's heat, and of the air, by promoting the evaporation of the watery vapours, and preventing the brine from being diluted with rain, it is very probable that, during the ſummer ſeaſon, double the quantity of ſalt might be prepared at an Engliſh work, with theſe contrivances, that is uſually prepared at a French ſalt-marſh of equal magnitude.

Beſides theſe methods of managing ſea-water, it is certain, that very large quantities of bay-ſalt might be prepared in England with great eaſe, from the natural brine of ſalt-ſprings, and from the common foſſile or rock-ſalt of Cheſhire, diſſolved in weak brine, or in ſea-water. Upon the whole, the bay-ſalt might thus be made here at a moderate price, and in ſufficient quantities to ſupply both the nation itſelf and all our colonies.

The following are the duties on ſalt, and laws relating thereto:—The duties upon ſalt are under the management of a diſtinct office, called the Salt-office, eſtabliſhed in 1694, ſubject to the direction of

 five

five commissioners, at an annual salary of 500l. each, who have, by statute 1 Anne, cap. 21. the same powers, and must observe the same regulations, as those of other excises. To this office belong also a comptroller, with an annual salary of 350l. deputy and clerks; a treasurer, who has for himself and clerks 430l. per annum; his deputy and clerk; a secretary at 200l. per annum; assistant-secretary and clerk; an accomptant-general at 200l. per annum, and clerk; solicitor at 150l. per annum; correspondent at 100l. per annum, and clerk; chief accomptant and clerk of securities at 180l. per annum; two accomptants and assistant clerks; housekeeper at 100l. a-year; storekeeper and clerk of the charity and diaries; collector of London port; assistant-searcher; two surveyors, &c.

By 5 W. cap. 7. a duty is laid on home salt of 1½d. a gallon; which, by 7 and 8 W. cap. 31. is extended to all salt made from rock-salt, salt refined, and salt made from salt. And by 9 and 10 W. cap. 44. a farther duty is imposed on all such salt of 3½d. gallon; the same amounting in the whole to 3s. 4d. a bushel: salt being estimated at 56lb. to the bushel. These duties were repealed by 3 Geo. II. cap. 20. but were revived by 5 Geo. II. cap. 6. for three years, continued from time to time, and made perpetual by 26 Geo. II. cap. 3. By 5 W. cap. 7. there shall be paid for every gallon of foreign salt imported 3d. over and above other duties; and by 9 and 10 W. c. 44. an additional duty is laid of 7d. a gallon: the same amounting in the whole to 6s. 8d. a bushel: the gallon to be rated after 8 gallons to the bushel Winchester measure; and 84lb. of foreign salt shall be deemed a bushel. 1 Anne, stat. i. cap. 21. By 9 Anne, cap. 23. a farther duty, over and above the duty on home salt, 9s. a ton, is laid on all rock-salt exported to Ireland; and rock-salt shall be ascertained, as to payment of the duties, at 65lb. weight to the bushel. By 20 Geo. III. cap. 34, an additional duty upon salt is charged, as follows: viz. for every gallon of salt imported, not being the product or manufacture of Great Britain, the sum of 2½d. for every gallon of salt and rock-salt, made at any salt-works or taken out of any pit in England, 1¼d. for every bushel of salt, made at any salt-works or taken out of any pit in Scotland, 3d. and for every bushel of salt imported from Scotland into England, 7d. By 8 Geo. III. cap. 25, foul salt, produced in the manufacturing of white salt, not fit to be applied to the curing of provisions, but which may be beneficial to agriculture, shall be charged only with a duty of 4d. in a bushel. The duties on foreign salt shall be paid by the importer, on entry, and before landing; who, on giving security to the collector, shall be allowed six months for payment, or at the rate of 10l. per cent. per annum, upon paying ready money. 9 and 10 W. cap. 44. Farther time is allowed, if the salt imported amounts to more than forty bushels, under certain restrictions, by 5 Anne, cap. 29. No foreign salt shall be imported in any ship of less burthen than forty tons, on pain of forfeiting the salt, and double its value, 3 Geo. II. cap. 20. and salt that is landed before payment of the duty is forfeited, and also 10s. a bushel; and every person assisting therein shall forfeit 100l. Obstructing an officer searching a ship incurs a forfeiture of 40l. 5 Geo. cap. 18. Importing or landing British salt in England incurs a forfeiture of the same, and also of the ship and tackle; and every person assisting forfeits 20l. or is liable to six months imprisonment: which regulation is also extended

to ſalt ſhipped for exportation, and put on-ſhore again or taken out of the veſſel, 1, 2, and 3, Anne, cap. 14. 5 Geo. cap. 18. The duties on rock-ſalt refined into white ſalt ſhall be allowed, 10 and 11 W. cap. 22. but no rock-ſalt ſhall be refined, or made into white ſalt, in any place, except within ten miles of the pit, &c. on pain of 40s. a buſhel, 1 Anne, ſtat. i. cap. 21. By the ſame act, every maker of ſalt, refiner of rock-ſalt, and proprietor of any ſalt-works or pits, who ſhall ſet up or uſe any ſalt-work, pit, pan, ſtorehouſe, warehouſe, &c. for making, laying, refining, or keeping, of ſalt, without giving notice at the next ſalt-office, ſhall forfeit 40l. and the officer ſhall be allowed to enter and ſurvey, under a forfeiture of 40l. and obſtructing the officer in his duty incurs a forfeiture of 20l. Nor ſhall any ſalt be delivered from any works or pits without notice to the officer, on pain of forfeiting the ſame, 10s. a buſhel, and 20l. 5 W. cap. 7. 9 and 10 W. cap. 44. Any officer neglecting or violating his duty incurs a forfeiture of double the value of the ſalt clandeſtinely conveyed away and landed, and alſo 10s. a buſhel. 5 Geo. III. cap. 43. Salt ſhall be weighed before removal, in the preſence of the ſalt-officer, or the proprietor ſhall forfeit 20l. and double the value. 10 and 11 W. cap. 22. Upon entry of ſalt, made or imported, the officer ſhall give a warrant, impowering the removal of it, on paying or ſecuring the duty in nine months; but any perſon, paying ready money, ſhall be allowed at the rate of 10 per cent. per annum. 5 W. cap. 7. 5 Anne, cap. 29. The duties on rock-ſalt ſhall be paid, or ſecurity given to pay, in twelve months, on pain of double value of the duties; or, if they are paid within two days after the charge is made, 10l. per cent. per annum ſhall be allowed. Officers may ſeize ſalt carried before entry without a permit, which, if not claimed within ten days, ſhall be forfeited and ſold; but, if it be claimed without evidence of entry and warrant for removing it, it ſhall be forfeited: and every perſon, who ſhall carry it before entry and warrant, ſhall forfeit double the value, and 10s. a buſhel. 5 W. cap. 7. 9 and 10 W. cap. 44. And by 5 Anne, cap. 21, the officer may ſeize and ſecure the offender. By 2 and 3 Anne, cap. 14, he that ſhall carry ſalt without a permit ſhall forfeit 20l. Permits ſhall be delivered gratis by the ſalt-officers. 7 and 8 W. cap. 31. And ſight of theſe may be demanded. 5 Geo. III. cap. 43. The lord-mayor and aldermen in London, and the juſtices of the peace in the county, at their general ſeſſions, may ſet and publiſh in writing the prices of ſalt, and alter the ſame as occaſion requires; and perſons refuſing to ſell at ſuch price, or ſelling at a higher price, ſhall forfeit 5l. half to the king, and half to the informer. 7 and 8 W. cap. 31. No perſon, dealing in ſalt, ſhall ſell it otherwiſe than by weight, after the rate of 56lb. to the buſhel, on pain of 5l. to the informer. 9 and 10 W. cap. 6. Nor ſhall any perſon buy ſalt otherwiſe than by weight, on pain of 10s. a buſhel. 1 Anne, ſtat. i. cap. 21. No ſalt ſhall be carried coaſtwiſe before the duty is paid or ſecured. 5 W. cap. 7. It ſhall be weighed when put on-board, and a permit given, on pain of forfeiture of 10s. a buſhel. 10 and 11 W. cap. 22. And the cocquet, ſigned by the ſalt-office, ſhall expreſs the quantity. 1 Anne, ſtat. i. cap. 11. Allowance ſhall be made for waſte, at the rate of three buſhels for forty of white ſalt, and one buſhel and a half for forty of rock-ſalt. 5 Anne, cap. 29. 6 Anne, cap. 12. The officer at the unlading port may demand a ſight of the

the permit, and weigh the salt upon unlading; and, if it weighs more than the permit expresses, the surplusage shall be forfeited. There shall be a drawback of the duties on salt exported; besides an allowance of four bushels for forty of white salt, and two bushels for forty of rock-salt, exported to Ireland, on account of the waste of carriage: but, if any such be relanded without entry and payment of duties, the offender shall forfeit double value and 10s. a bushel, and the other penalties for foreign salt landed unentered. 5 W. cap. 7. 9 and 10 W. cap. 14. 10 and 11 W. cap. 22. 5 Anne, cap. 29. The curers of fish for exportation may import foreign salt, or take from the pit or work British salt, or rock-salt refined, without duty, except the customs on importation, entering the quantity, and an account of the same being kept by the officer. 5 Geo. cap. 18. For the various regulations relating to this business, we must refer also to 8 Geo. cap. 16. 11 Geo. cap. 30. 8 Geo. II. cap. 12. 19 Geo. III. cap. 52. By 5 Anne, cap. 29. there shall be allowed five shillings for every barrel of salted beef or pork exported for sale; but, if such beef or pork be relanded, it shall be forfeited, and 40s. a bushel. By 1 Anne, stat. i. cap. 21. no person shall use any brine before it is boiled into salt, or any rock-salt before it is refined, for pickling or curing flesh or fish, on pain of 40s. for every gallon of brine or pound of rock-salt. See Burn's Justice, art. Excise. There is a custom-duty in the city of London, called granage, payable to the lord-mayor, &c. for salt brought to the port of London, being the twentieth part.

The annual amount of the duty on the salt made at Droitwich is from 150,000 to 200,000l. which duty is paid regularly every Wednesday into the collector's hands by the different proprietors of the salt-works. Here are a number of officers appointed by the commissioners of the salt-duties, viz. a collector, a supervisor, and a clerk for their use; about twenty officers, at a salary of 40l. per annum each, whose business is to take an account of the weight of the salt weighed at the different salt-works; a number of supernumeraries and watchmen to attend vessels whilst they are loading salt, and to keep watch over the salt-works at night, to prevent the people from carrying on the practice of running salt; their salaries are from 20 to 25l. a-year. The hours for the officers to attend weighing salt is from sun-rise to sun-set. The quantity of salt made here in 1772 amounted to 604,579 bushels, at the rate of 3s. 6d. a bushel; and in 1773 to 721,694 bushels, at 2s. 11d.

PYROTECHNY; OR THE ART OF PREPARING ALL KINDS OF FIRE-WORKS.

OF INGREDIENTS AND COMPOSITIONS.

SALTPETRE being the principal ingredient in fire-works, and a volatile body, by reason of its aqueous and aerial parts, is easily rarefied by fire; but not so soon when foul and gross as when purified from its crude and earthy parts, which greatly retard its velocity: therefore, when any quantity of fire-works are to be made, it should be examined; for if it is not well cleansed, and of a good sort, your works will not have their proper effect; neither will it agree with the standing proportions of compositions. Therefore,

To refine it, put into a copper, or any other vessel, 100lb. of rough nitre with 14 gallons of clean water; let it boil gently half an hour,

and as it boils take off the scum: then stir it, and before it settles put it into your filtering bags, which must be hung on a rack, with glazed earthen pans under them, in which must be sticks laid across for the crystals to adhere to: it must stand in the pans two or three days to shoot; then take out the crystals, and let them dry. The water that remains in the pans boil again an hour, and strain it into the pans as before, and the saltpetre will be quite clear and transparent; if not, it wants more refining; to do which proceed as usual, till it is well cleansed of all its earthy parts. Those who do not choose to procure their saltpetre by the above method, may buy it ready made.

To pulverise Saltpetre. Take a copper kettle, whose bottom must be spherical, and put into it 14lb. of refined saltpetre, with two quarts or five pints of clean water: then put the kettle on a slow fire; and when the saltpetre is dissolved, if any impurities arise, skim them off, and keep constantly stirring with two large spatulas, till all the water exhales; and, when done enough, it will appear like white sand, and as fine as flour; but, if it should boil too fast, take the kettle off the fire, and set it on some wet sand, which will prevent the nitre from sticking to the kettle. When you have pulverised a quantity of saltpetre, be careful to keep it in a dry place.

To extract Saltpetre from damaged Gunpowder.—Have some filtering bags, hung on a rack, with glazed earthen pans under them, in the same manner as those for refining saltpetre; then take any quantity of damaged powder, and put it into a copper, with as much clean water as will cover it: when it begins to boil, take off the scum; and, after it has boiled a few minutes, stir it up: then take it out of the copper with a small hand-kettle for that purpose, and put some into each bag, beginning at one end of the rack, so that by the time you have got to the last bag, the first will be ready for more. Continue thus till all the bags are full: then take the liquor out of the pans; which boil and filter, as before, two or three times, till the water run quite clear, which you must let stand in the pan some time, and the saltpetre will appear at top. To get the saltpetre entirely out of the powder, take the water from that already extracted, to which add some fresh, and the dregs of the powder that remain in the bags, and put them in a vessel, to stand as long as you please: and, when you want to extract the nitre, you must proceed with this mixture as with the powder at first, by which means you will draw out all the saltpetre; but this process must be boiled longer than the first.

SULPHUR, OR BRIMSTONE.—Sulphur is one of the principal ingredients in gunpowder, and almost in all compositions of fire-works; and therefore great care must be taken of its being good, and brought to the highest perfection. To know when sulphur is good, you are to observe that it is of a high yellow; and if, when held in one's hand, it crackles and bounces, it is a sign that it is fresh and good: but, as the method of reducing brimstone to a powder is very troublesome, it is better to buy the flour ready made, which is done in large quantities, and in great perfection; though when a grand collection of fire-works is to be made, the strongest and best sulphur is the lump brimstone ground in the manner directed farther on.

CHARCOAL.—Charcoal is a preservative by which the saltpetre and brimstone are made into gunpowder, by preventing the sulphur

from suffocating the strong and windy exhalation of the nitre. Charcoal for fire-works must always be soft and well burnt, which may be bought ready done.

Gunpowder.—Take four ounces of refined saltpetre, an ounce of brimstone, and six drams of small-coal; reduce these to a fine powder, and continue beating them for some time in a stone mortar, with a wooden pestle, wetting the mixture between whiles with water, so as to form the whole into an uniform paste, which is reduced to grains, by passing it through a wire sieve fit for the purpose; and in this form being carefully dried, it becomes the common gunpowder. For making great quantities mills are built, by means of which more work may be done in one day than a man can do in a hundred.

Camphor.—This may be had in the shops; and is of two kinds, differing in regard to the degree of their purity, and distinguished by the name of *rough* and *refined*. Refined camphor must be chosen of a perfectly clean white colour, very bright and pellucid, of the same smell and taste with the rough, but more acrid and pungent. It is so volatile, that merchants usually inclose it in lintseed, that the viscosity of that grain may keep its particles together.

Benjamin.—This is a resin found of different sorts; and distinguished by their colours, viz. yellow, grey, and brown; but the best is that which is easy to break, and full of white spots. It is one of the ingredients in odoriferous fire-works, when reduced to a fine flour; which may be done by putting into a deep and narrow earthen pot 3 or 4 oz. of benjamin grossly pounded; cover the pot with paper, which tie very close round the edge; then set the pot on a slow fire, and once in an hour take off the paper, and you will find some flour sticking to it, which return again into the pot; this you must continue till the flour appears white and fine. There is also an oil of benjamin, which is sometimes drawn from the dregs of the flour; it affords a very good scent, and may be used in wet compositions.

Spur-Fire.—This fire is the most beautiful and curious of any yet known; and was invented by the Chinese, but now is in greater perfection in England than in China. As it requires great trouble to make it to perfection, it will be necessary that beginners should have full instructions; therefore care should be taken that all the ingredients are of the best, that the lamp-black is not damp and clodded, that the saltpetre and brimstone are thoroughly refined. This composition is generally rammed in 1 or 2 oz. cases about 5 or 6 inches long, but not driven very hard; and the cases must have their concave stroke struck very smooth, and the choak or vent not quite so large as the usual proportion: this charge, when driven and kept a few months, will be much better than when rammed; and will not spoil, if kept dry, in many years.

As the beauty of this composition cannot be seen at so great a distance as brilliant fire, it has a better effect in a room than in the open air, and may be fired in a chamber without any danger: it is of so innocent a nature, that, though with an improper phrase, it may be called a *cold fire*; and so extraordinary is the fire produced from this composition, that, if well made, the sparks will not burn a handkerchief when held in the midst of them; you may hold them in your hand while burning, with as much safety as a candle; and, if you put your hand within a foot of the mouth of the case, you will

will feel the ſparks like drops of rain.—When any of theſe ſpur-fires are fired ſingly, they are called *artificial flower-pots* ; but ſome of them placed round a tranſparent pyramid of paper, and fired in a large room, make a very pretty appearance.

The compoſition conſiſts of ſaltpetre 4lb. 8 oz. ſulphur 2lb. and lamp-black 1lb. 8 oz. or, ſaltpetre 1lb. ſulphur $\frac{1}{2}$lb. and lamp-black 4 quarts.—This compoſition is very difficult to mix. The ſaltpetre and brimſtone muſt be firſt ſifted together, and then put into a marble mortar, and the lamp-black with them, which you work down by degrees with a wooden peſtle, till all the ingredients appear of one colour, which will be ſomething greyiſh, but very near black : then drive a little into a caſe for trial, and fire it in a dark place ; and if the ſparks, which are called *ſtars*, or *pinks*, come out in cluſters, and afterwards ſpread well without any other ſparks, it is a ſign of its being good, otherwiſe not ; for if any droſſy ſparks appear, and the ſtars not full, it is then not mixed enough ; but if the pinks are very ſmall, and ſoon break, it is a ſign that you have rubbed it too much.

This mixture, when rubbed too much, will be too fierce, and hardly ſhew any ſtars ; and, on the contrary, when not mixed enough, will be too weak, and throw out an obſcure ſmoke, and lumps of droſs, without any ſtars. The reaſon of this charge being called the ſpur-fire, is becauſe the ſparks it yields have a great reſemblance to the rowel of a ſpur, from whence it takes its name.

To meal Gunpowder, Brimſtone, and Charcoal.

There have been many methods uſed to grind theſe ingredients to a powder for fire-works, ſuch as large mortars and peſtles made of ebony and other hard wood, and horizontal mills with braſs barrels: but none have proved ſo effectual and ſpeedy as the laſt invention, that of the mealing-table, made of elm, with a rim round its edge four or five inches high ; and at the narrow end is a ſlider that runs in a groove, and forms part of the rim: ſo that, when you have taken out of the table as much powder as you can with the copper ſhovel, ſweep all clean out at the ſlider. When you are going to meal a quantity of powder, obſerve not to put too much in the table at once ; but, when you have put in a good proportion, take the muller and rub it till all the grains are broke : then ſearce it in a lawn ſieve that has a receiver and top to it ; and that which does not paſs through the ſieve, return again to the table, and grind it till you have brought it all fine enough to go through the ſieve. Brimſtone and charcoal are ground in the ſame manner, only the muller muſt be made of ebony ; for theſe ingredients, being harder than powder, would ſtick in the grain of elm, and be difficult to grind. As brimſtone is apt to ſtick and clod to the table, it will be beſt to keep one for that purpoſe, by which means you will always have your brimſtone clean and well ground. Theſe may be purchaſed at any of the turners ſhops in London.

To make Wheels and other Works incombuſtible.

It being neceſſary, when your works are new, to paint them of ſome dark colour ; therefore, if, inſtead of paint, you make uſe of the following compoſition, it will give them a good colour, and in a great meaſure prevent their taking fire ſo ſoon as if painted. Take brick-

brick-duſt, coal-aſhes, and iron-filings, of each an equal quantity, and mix them with a double ſize, made hot. With this waſh over your works, and when dry waſh them over again; this will preſerve the wood greatly againſt fire. Let the brick-duſt and aſhes be beat to a fine powder.

To prepare Caſt-iron for Gerbes, white Fountains, and Chineſe Fire.

Caſt-iron being of ſo hard a nature as not to be cut by a file, we are obliged to reduce it into grains, though ſomewhat difficult to perform; but, if we conſider what beautiful ſparks this ſort of iron yields, no pains ſhould be ſpared to granulate ſuch an eſſential material: to do which, get at an iron-foundery ſome thin pieces of iron, ſuch as generally run over the mould at the time of caſting: then have a ſquare block made of caſt-iron, and an iron ſquare hammer about four pounds weight; then, having covered the floor with cloth or ſomething to catch the beatings, lay the thin pieces of iron on the block, and beat them with the hammer till reduced into ſmall grains; which afterwards ſearce with a very fine ſieve, to ſeparate the fine duſt, which is ſometimes uſed in ſmall caſes of brilliant fire, inſtead of ſteel-duſt; and, when you have got out all the duſt, ſift what remains with a ſieve a little larger, and ſo on with ſieves of different ſizes, till the iron paſſes through about the bigneſs of ſmall bird-ſhot: your iron thus beat and ſifted, put each ſort into wooden boxes or oiled paper, to keep it from ruſting. When you uſe it, obſerve the difference of its ſize, in proportion to the caſes for which the charge is intended; for the coarſe ſort is only deſigned for very large gerbes of 6 or 8 lb.

Charges for Sky-rockets, &c.

Rockets of four ounces.—Mealed powder 1lb. 4 oz. ſaltpetre 4 oz. and charcoal 2 oz.

Rockets of eight ounces.—Method I. Mealed powder 1lb. ſaltpetre 4 oz. brimſtone 3 oz. and charcoal 1½ oz. Method II. Meal-powder 1½lb. and charcoal 4¼ oz.

Rockets of one pound.—Meal-powder 2lb. ſaltpetre 8 oz. brimſtone 4 oz. charcoal 2 oz. and ſteel-filings 1½ oz.

Sky-rockets in general.—Method I. Saltpetre 4lb. brimſtone 1lb. and charcoal 1½lb. II. Saltpetre 4lb. brimſtone 1½lb. charcoal 1lb. 12 oz. and meal-powder 2 oz.

Large Sky-rockets.—Saltpetre 4lb. meal-powder 1lb. and brimſtone 1lb.

Rockets of a middling ſize.—Method I. Saltpetre 8lb. ſulphur 3lb. meal-powder 3lb. II. Saltpetre 3lb. ſulphur 2lb. meal-powder 1lb. charcoal 1lb.

For Rocket Stars.

White Stars.—Meal-powder 4 oz. ſaltpetre 12 oz. ſulphur vivum 6 oz. oil of ſpike 2 oz. and camphor 5 oz.

Blue ſtars.—Meal-powder 8 oz. ſaltpetre 4, ſulphur 2, ſpirit of wine 2, and oil of ſpike 2.

Coloured or variegated ſtars.—Meal-powder 8 drams, rochpetre 4 oz. ſulphur vivum 2, and camphor 2.

Brilliant ſtars.—Saltpetre 3½ oz. ſulphur 1½, and meal-powder ¾, worked up with ſpirits of wine only.

Common ſtars.—Saltpetre 1lb. brimſtone 4 oz. antimony 4¾, iſinglaſs ½, camphor ½, and ſpirit of wine ¾.

Tailed ſtars or ſnakes.—Meal-powder 3 oz. brimſtone 2, ſaltpetre 1, and charcoal (coarſely ground) $\frac{3}{4}$.

Drove ſtars.—Method I. Saltpetre 3lb. ſulphur 1lb. braſs duſt 12 oz. antimony 3. II. Saltpetre 1lb. antimony 4 oz. and ſulphur 8.

Fixed pointed ſtars.—Saltpetre 8$\frac{1}{2}$ oz. ſulphur 2, antimony 1 oz. 10 dr.

Stars of a fine colour.—Sulphur 1 oz. meal-powder 1, ſaltpetre 1, camphor 4 dr. oil of turpentine 4 dr.

Rains.

Gold rain for ſky-rockets.—Method I. Saltpetre 1lb. meal-powder 4 oz. ſulphur 4, braſs-duſt 1, ſaw-duſt 2$\frac{1}{4}$, and glaſs-duſt 6 dr. II. Meal-powder 12 oz. ſaltpetre 2, charcoal 4. III. Saltpetre 8 oz. brimſtone 2, glaſs-duſt 1, antimony $\frac{3}{4}$, braſs-duſt $\frac{1}{4}$, and ſaw-duſt 12 dr.

Silver rain.—Method I. Saltpetre 4 oz. ſulphur, meal-powder, and antimony, of each 2 oz. ſal prunella $\frac{1}{2}$ oz. II. Saltpetre $\frac{1}{2}$lb. brimſtone 2 oz. and charcoal 4. III. Saltpetre 1lb. brimſtone $\frac{1}{4}$lb. antimony 6 oz. IV. Saltpetre 4 oz. brimſtone 1, powder 2, and ſteel-duſt $\frac{3}{4}$ oz.

Water Rockets.

Method I. Meal-powder 6lb. ſaltpetre 4, brimſtone 3, charcoal 5. II. Saltpetre 1lb. brimſtone 4$\frac{1}{2}$ oz. charcoal 6. III. Saltpetre 1lb. brimſtone 4 oz. charcoal 12. IV. Saltpetre 4lb. brimſtone 1$\frac{1}{2}$lb. charcoal 1lb. 12 oz. V. Brimſtone 2lb. ſaltpetre 4lb. and meal-powder 4. VI. Saltpetre 1lb. meal-powder 4 oz. brimſtone 8$\frac{1}{2}$, charcoal 2. VII. Meal-powder 1lb. ſaltpetre 3, brimſtone 1; ſea-coal 1 oz. charcoal 8$\frac{1}{2}$, ſaw-duſt $\frac{3}{4}$, ſteel-duſt $\frac{1}{2}$, and coarſe charcoal $\frac{1}{4}$ oz. VIII. Meal-powder 1$\frac{3}{4}$lb. ſaltpetre 3, ſulphur 1$\frac{1}{2}$, charcoal 12 oz, ſaw-duſt 2.

Sinking charges for water-rockets.—Meal-powder 8 oz. charcoal $\frac{3}{4}$ oz.

Of Wheels.

Wheel-caſes from two ounces to four pounds.—Method I. Meal-powder 2lb. ſaltpetre 4 oz. iron-filings 7. II. Meal-powder 2lb. ſaltpetre 12 oz. ſulphur 4, ſteel-duſt 3. III. Meal-powder 4lb. ſaltpetre 1lb. brimſtone 8 oz. charcoal 4$\frac{1}{2}$. IV. Meal-powder 8 oz. ſaltpetre 4, ſaw-duſt 1$\frac{1}{2}$, ſea-coal $\frac{3}{4}$. V. Meal-powder 1lb. 4 oz. brimſtone 4 oz. 10 dr. ſaltpetre 8 oz. glaſs-duſt 2$\frac{1}{2}$. VI. Meal-powder 12 oz. charcoal 1, ſaw-duſt $\frac{1}{2}$. VII. Saltpetre 1lb. 9 oz. brimſtone 4 oz. charcoal 4$\frac{1}{2}$. VIII. Meal-powder 2lb. ſaltpetre 1, brimſtone $\frac{1}{2}$, and ſea-coal 2 oz. IX. Saltpetre 2lb. brimſtone 1, meal-powder 4, and glaſs-duſt 4 oz. X. Meal-powder 1lb. ſaltpetre 2 oz. and ſteel-duſt 3$\frac{1}{2}$. XI. Meal-powder 2lb. and ſteel-duſt 1$\frac{1}{2}$ oz. with 2$\frac{1}{2}$ of the fine duſt of beat iron. XII. Saltpetre 2lb. 13 oz. brimſtone 8 oz. and charcoal.

Slow fire of wheels.—Method I. Saltpetre 4 oz. brimſtone 2, and meal-powder 1$\frac{1}{2}$. II. Saltpetre 4 oz. brimſtone 1, and antimony 1 oz. 6 dr. III. Saltpetre 4$\frac{1}{2}$ oz. brimſtone 1 oz. and mealed powder 1$\frac{1}{2}$.

Dead fire for wheels.—Method I. Saltpetre 1$\frac{1}{4}$ oz. brimſtone $\frac{1}{4}$, lapis-calaminaris $\frac{1}{4}$, and antimony 2 dr.

Standing on fixed Caſes.

Method I. Meal-powder 4lb. ſaltpetre 2, brimſtone and charcoal 1. II. Meal-powder 2lb. ſaltpetre 1, and ſteel-duſt 8 oz. III. Meal-powder 1lb. 4 oz. and charcoal 4 oz. IV. Meal-powder 2lb. and

ſteel-duſt 4 oz. V. Meal-powder $2\frac{1}{2}$lb. brimſtone 4 oz. and ſea-coal 6. VI. Meal-powder 3lb. charcoal 5 oz. and ſaw-duſt $1\frac{1}{2}$.

Sun Caſes.

Method I. Meal-powder $8\frac{1}{2}$lb. ſaltpetre 1lb. 2 oz. ſteel-duſt 2lb. 10 oz. brimſtone 4. II. Meal-powder 3lb. ſaltpetre 6 oz. and ſteel-duſt $7\frac{1}{2}$.

A brilliant Fire.

Meal-powder 11lb. ſaltpetre 1, brimſtone 4 oz. ſteel-duſt $1\frac{1}{2}$lb.

Gerbes.

Meal-powder 6lb. and beat-iron 2lb. $1\frac{1}{2}$ oz.

Chineſe Fire.

Saltpetre 12 oz. meal-powder 2lb. brimſtone 1lb. 2 oz. and beat iron 12 oz.

Tourbillons.

Charge for four-ounce Tourbillons.—Meal-powder 2lb. 4 oz. and charcoal $4\frac{1}{2}$ oz.

Eight-ounce Tourbillons.—Meal-powder 2lb. and charcoal $4\frac{3}{4}$ oz.

Large Tourbillons.—Meal-powder 2lb. ſaltpetre 1, brimſtone 8 oz. and beat iron 8. Tourbillons may be made very large, and of different coloured fires; only you are to obſerve, that the larger they are, the weaker muſt be the charge; and, on the contrary, the ſmaller, the ſtronger their charge.

Water Balloons.

Method I. Saltpetre 4lb. brimſtone 2, meal-powder 2, antimony 4 oz. ſaw-duſt 4, and glaſs-duſt $1\frac{1}{2}$. II. Saltpetre 9lb. brimſtone 3lb. meal-powder 6lb. roſin 12 oz. and antimony 8 oz.

Water Squibs.

Method I. Meal-powder 1lb. and charcoal 1lb. II. Meal-powder 1lb. and charcoal 9 oz.

Mine Ports or Serpents.

Method I. Meal-power 1lb. and charcoal 1lb. II. Meal-powder 1lb. charcoal 9 oz.

Port-fires.

For firing rockets, &c.—Method I. Saltpetre 12 oz. brimſtone 4 oz. and meal-powder 2 oz. II. Saltpetre 8 oz. brimſtone 4 oz. and meal-powder 2 oz. III. Saltpetre 1lb. 2 oz. meal-powder $1\frac{1}{2}$lb. and brimſtone 10 oz. This compoſition muſt be moiſtened with one gill of linſeed-oil. IV. Meal-powder 6 oz. ſaltpetre 2lb. 2 oz. and brimſtone 10 oz. V. Saltpetre 1lb. 4 oz. meal-powder 4 oz. brimſtone 5 oz. ſaw-duſt 8 oz. VI. Saltpetre 8 oz. brimſtone 2 oz. and meal-powder 2 oz.

For illuminations.—Saltpetre 1lb. brimſtone 8 oz. and meal-powder 6 oz.

Cones or ſpiral Wheels.

Saltpetre $1\frac{1}{2}$lb. brimſtone 6 oz. meal-powder 14 oz. and glaſs-duſt 14 oz.

Crowns or Globes.

Saltpetre 6 oz. brimſtone 2lb. antimony 4 oz. and camphor 2 oz.

Air Balloon Fuzes.

Method I. Saltpetre 1lb. 10 oz. brimſtone 8 oz. and meal-powder 1lb. 6 oz. II. Saltpetre 1½lb. brimſtone 8 oz. and meal-powder 1lb. 8 oz.

Serpents for Pots de Brins.

Meal-powder 1lb. 8 oz. ſaltpetre 12 oz. and charcoal 2 oz.

Fire-pumps..

Method I. Saltpetre 5 lb. brimſtone 1lb. meal-powder 1½lb. and glaſs-duſt 1lb. II. Saltpetre 5 lb. 8 oz. brimſtone 2 lb. meal-powder 1lb. 8 oz. and glaſs-duſt 1lb. 8 oz.

A Slow White Flame.

Method I. Saltpetre 2 lb. brimſtone 3 lb. antimony 1lb. II. Saltpetre 3½ lb. ſulphur 2½ lb. meal-powder 1 lb. antimony ½ lb. glaſs-duſt 4 oz. braſs-duſt 1 oz. Theſe compoſitions, driven 1½ inch in a 1 oz. caſe, will burn one minute, which is a much longer time than an equal quantity of any compoſition yet known will laſt.

Amber Lights.

Meal-powder 9 oz. amber 3 oz. This charge may be driven in ſmall caſes, for illuminations.

Lights of another Kind.

Saltpetre 3 lb. brimſtone 1 lb. meal-powder 1 lb. antimony 10½ oz. All theſe muſt be mixed with the oil of ſpike.

A Red Fire.

Meal-powder 3 lb. charcoal 12 oz. and ſaw-duſt 8 oz.

A common Fire.

Saltpetre 3 lb. charcoal 10 oz. and brimſtone 2 oz.

To make an artificial Earthquake.

Mix the following ingredients to a paſte with water, and then bury it in the ground, and in a few hours the earth will break and open in ſeveral places. The compoſition: ſulphur 4 lb. and ſteel-duſt 4 lb.

Compoſitions for Stars of different Colours.

Method I. Meal-powder 4 oz. ſaltpetre 2 oz. brimſtone 2 oz. ſteel-duſt 1¼ oz. and camphor, white amber, antimony, and mercury-ſublimate, of each ½ oz. II. Rochpetre 10 oz. brimſtone, charcoal, antimony, meal-powder, and camphor, each ¾ oz. moiſtened with oil of turpentine. Theſe compoſitions are made into ſtars, by being worked to a paſte with aqua vitæ, in which has been diſſolved ſome gum-tragacanth; and, after you have rolled them in powder, make a hole through the middle of each, and ſtring them on quick-match, leaving about two inches between each. III. Saltpetre 8 oz. brimſtone 2 oz. yellow amber 1 oz. antimony 1 oz. and powder 3 oz. IV. Brimſtone 2½ oz. ſaltpetre 6 oz. olibanum or frankincenſe in drops 4 oz. maſtic, and mercury-ſublimate, of each 4 oz. meal-powder 5 oz. white amber, yellow amber, and camphor, of each 1 oz. antimony and orpiment ½ oz. each. V. Saltpetre 1lb. brimſtone ½ lb. and

and meal-powder 8 oz. moiftened with petrolio-oil. VI. Powder ½ lb. brimftone and faltpetre of each 4 oz. VII. Saltpetre 4 oz. brimftone 2 oz. and meal-powder 1 oz.

Stars that carry Tails of Sparks.—Method I. Brimftone 6 oz. antimony crude 2 oz. faltpetre 4 oz. and rofin 4 oz. II. Saltpetre, rofin, and charcoal, of each 2 oz. brimftone 1 oz. and pitch 1 oz. Thefe compofitions are fometimes melted in an earthen pan, and mixed with chopped cotton-match, before they are rolled into ftars; but will do as well if wetted, and worked up in the ufual manner.

Stars that yield fome Sparks.—Method I. Camphor 2 oz. faltpetre 1 oz. meal-powder 1 oz. II. Saltpetre 1 oz. ditto melted ½ oz. and camphor 2 oz. When you would make ftars of either of thefe compofitions, you muft wet them with gum-water, or fpirit of wine, in which has been diffolved fome gum-arabic, or gum-tragacanth, that the whole may have the confiftence of a pretty thick liquid; having thus done, take 1 oz. of lint, and ftir it about in the compofition till it becomes dry enough to roll into ftars.

Stars of a Yellowifh Colour.—Take 4 oz. of gum-tragacanth or gum-arabic, pounded and fifted through a fieve, camphor diffolved in brandy 2 oz. falt-petre 1 lb. fulphur ½ lb. coarfe powder of glafs 4 oz. white amber 1½ oz. orpiment 2 oz. Being well incorporated, make them into ftars after the common method.

Stars of another kind.—Take 1 lb. of camphor, and melt it in a pint of fpirit of wine over a flow fire; then add to it 1 lb. of gum-arabic that has been diffolved; with this liquor mix 1 lb. of faltpetre, 6 oz. of fulphur, and 5 oz. of meal-powder; and, after you have ftirred them well together, roll them into ftars proportionable to the rockets for which you intend them.

Colours produced by the different Compofitions.

As variety of fires adds greatly to a collection of works, it is neceffary that every artift fhould know the different effect of each ingredient. For which reafon, we fhall here explain the colours they produce of themfelves; and likewife how to make them retain the fame when mixed with other bodies: as for example, fulphur gives a blue, camphor a white or pale colour, faltpetre a clear white yellow, amber a colour inclining to yellow, fal-ammoniac a green, antimony a reddifh, rofin a copper, colour, and Greek pitch a kind of bronze, or between red and yellow. All thefe ingredients are fuch as fhew themfelves in a flame, viz.

White Flame.—Saltpetre, fulphur, meal-powder, and camphor; the faltpetre muft be the chief part.

Blue Flame.—Meal-powder, faltpetre, and fulphur vivum; fulphur muft be the chief: or, meal-powder, faltpetre, brimftone, fpirit of wine, and oil of fpike; but let the powder be the principal part.

Flame inclining to Red.—Saltpetre, fulphur, antimony, and Greek-pitch; faltpetre the chief. By the above method may be made various colours of fire, as the practitioner pleafes; for, by making a few trials, he may caufe any ingredient to be predominant in colour.

Ingredients that fhew in Sparks when rammed in choaked Cafes.

The fet colours of fire produced by fparks are divided into four forts, viz. the black, white, grey, and red. The black charges are compofed of two ingredients, which are meal-powder and charcoal; the

the white of three, viz. ſaltpetre, ſulphur, and charcoal; the grey of four, viz. meal-powder, ſalt-petre, brimſtone, and charcoal; and the reſt of three, viz. meal-powder, charcoal, and ſaw-duſt. There are, beſides theſe four regular or ſet charges, two others, which are diſtinguiſhed by the names of *compound* and *brilliant charges*; the compound being made of many ingredients, ſuch as meal-powder, ſaltpetre, brimſtone, charcoal, ſaw-duſt, ſea-coal, antimony, glaſs-duſt, braſs-duſt, ſteel filings, caſt iron, tanner's duſt, &c. or any thing that will yield ſparks; all which muſt be managed with diſcretion. The brilliant fires are compoſed of meal-powder, ſaltpetre, brimſtone, and ſteel-duſt; or with meal-powder and ſteel filings only.

Cotton Quick-match

Is generally made of ſuch cotton as is put in candles, of ſeveral ſizes, from one to ſix threads thick, according to the pipe it is deſigned for; which pipe muſt be large enough for the match, when made, to be puſhed in eaſily without breaking it. Having doubled the cotton into as many threads as you think proper, coil it very lightly into a flat-bottomed copper or earthen pan; then put in the ſaltpetre and the liquor, and boil them about twenty minutes; after which coil it again into another pan, and pour on it what liquor remains; then put in ſome meal-powder, and preſs it down with your hands till it is quite wet; afterwards place the pan before a wooden frame, which muſt be ſuſpended by a point in the centre of each end; and place yourſelf before the pan, tying the upper end of the cotton to the end of one of the ſides of the frame. When every thing is ready, you muſt have one to turn the frame round, while you let the cotton paſs through your hands, holding it very lightly, and at the ſame time keeping your hands full of the wet powder; but, if the powder ſhould be too wet to ſtick to the cotton, put more in the pan, ſo as to keep a continual ſupply till the match is all wound up; you may wind it as cloſe on the frame as you pleaſe, ſo that it do not ſtick together; when the frame is full, take it off the points, and ſift dry meal-powder on both ſides the match, till it appear quite dry: in winter the match will be a fortnight before it is fit for uſe; when it is thoroughly dry, cut it along the outſide of one of the ſides of the frame, and tie it up in ſkins for uſe. The match muſt be wound tight on the frames. *The ingredients for the match*, are, cotton 1 lb. 12 oz. ſaltpetre 1 lb. ſpirit of wine 2 quarts, water 3 quarts, iſinglaſs 3 gills, and meal-powder 1 lb. To diſſolve 4 oz. of iſinglaſs, take 3 pints of water.

Touch-paper for capping of Serpents, Crackers, &c.

Diſſolve, in ſpirits of wine or vinegar, a little ſaltpetre; then take ſome purple or blue paper, and wet it with this liquor, and when dry it will be fit for uſe; when you paſte this paper on any of your works, take care that the paſte does not touch that part which is to burn. The method of uſing this paper is by cutting it into ſlips, long enough to go once round the mouth of a ſerpent, cracker, &c. When you paſte on theſe ſlips, leave a little above the mouth of the caſe not paſted; then prime the caſe with meal-powder, and twiſt the paper to a point.

(*To be continued.*)

On

ON THE EFFECTS OF OPIUM.

OPIUM is the juice of the papaver album, or white poppy, with which the fields of Afia Minor are in many places fown, as ours are with corn. When the heads are near ripening, they wound them with an inftrument that has five edges, which on being ftuck into the head makes at once five long cuts in it: and from thefe wounds the opium flows, and is next day taken off by a perfon who goes round the field, and put up in a veffel which he carries faftened to his girdle; at the fame time that this opium is collected, the oppofite fide of the poppy-head is wounded, and the opium collected from it the next day. They diftinguifh, however, the produce of the firft wounds from that of the fucceeding ones; for the firft juice afforded by the plant is greatly fuperior to what is obtained afterwards. After they have collected the opium, they moiften it with a fmall quantity of water or honey, and work it a long time upon a flat, hard, and fmooth, board, with a thick and ftrong inftrument of the fame wood, till it becomes of the confiftence of pitch; and then work it up with their hands, and form it into cakes or rolls for fale.

Opium at prefent is in great efteem, and is one of the moft valuable of all the fimple medicines. In its effects on the animal fyftem, it is the moft extraordinary fubftance in nature. It touches the nerves as it were by magic and irrefiftible power, and fteeps the fenfes in forgetfulnefs; even in oppofition to the determined will of the philofopher or phyfiologift, apprifed of its narcotic effect. The modification of matter is infinite; and who fhall truly fay by what peculiar or fpecific configuration of its parts, opium, even in the quantity of a fingle grain, adminiftered to the human body, fhall affuage the moft raging pain, and procure profound fleep? The action of matter upon matter, thus exemplified in the effect of opium on the animal fyftem, is not lefs aftonifhing and incomprehenfible, than that of fpirit upon matter or the agency of mind on the motive powers of the body.

The firft effects of opium are like thofe of a ftrong ftimulating cordial, but are foon fucceeded by univerfal languor or irrefiftible propenfity to fleep, attended with dreams of the moft rapturous and enthufiaftic kind. After thofe contrary effects are over, which are generally terminated by a profufe fweat, the body becomes cold and torpid; the mind penfive and defponding; the head is affected with ftupor, and the ftomach with ficknefs and naufea. It is not in our power to reconcile that diverfity of opinion which has lately prevailed concerning the manner in which opium produces its effects; or to determine whether it acts fimply on the brain and nerves, or, according to the experiments of Fontana, on the mafs of blood only.

Opium is the moft fovereign remedy in the materia medica, for eafing pain and procuring fleep, and alfo the moft certain antifpafmodic yet known; but, like other powerful medicines, becomes highly noxious to the human conftitution, and even mortal, when improperly adminiftered. Its liberal and long-continued ufe has been obferved greatly to injure the brain and nerves, and to diminifh their influence on the vital organs of the body. By its firft effects, which are exhilarating, it excites a kind of temporary delirium, which diffipates and exhaufts the fpirits; and, by its fubfequent narcotic power,

power, occaſions confuſion of ideas and loſs of memory, attended with nauſea, giddineſs, head-ach, and conſtipation of the bowels; in a word, it ſeems to ſuſpend or diminiſh all the natural ſecretions and excretions of the body, that of perſpiration only excepted.

Thoſe who take opium to exceſs become enervated and ſoon look old; when deprived of it, they are faint, and experience the languor and dejection common to ſuch men as drink ſpirituous liquors in exceſs; to the bad effects of which it is ſimilar, ſince, like thoſe, they are not eaſily removed without a repetition of the doſe. By the indiſcriminate uſe of that preparation of opium called *Godfrey's cordial*, many children are yearly cut off; for it is frequently given doſe after doſe, without moderation, by ignorant women and mercenary nurſes, to ſilence the cries of infants and lull them to ſleep, by which they are at laſt rendered ſtupid, inactive, and rickety.

Opium is univerſally known to be uſed as a luxury in the eaſt. Mr. Groſe informs us that moſt of the hard-labouring people at Surat, and eſpecially the porters, take great quantities of this drug, which, they pretend, enables them to work, and carry heavier burdens than they otherwiſe could do. Some of theſe, our author aſſures us, will take more than an ounce at a time without detriment. Many people in opulent circumſtances follow the ſame cuſtom, but with very different motives. Some uſe it merely for the ſake of the pleaſing delirium it occaſions; others for venereal purpoſes, as by means they can lengthen the amorous congreſs to what length they pleaſe, though they thus are certain to bring on an abſolute impotency and premature old age at laſt. For this purpoſe it is uſually taken in milk; and, when they have a mind to check or put an end to its operation, they ſwallow a ſpoonful or two of lime-juice, or any other ſimilar acid.

Beſides theſe effects of opium, it is ſaid by the Indians to have a very ſingular one in bringing on a ſeeming heavineſs of the head and ſleepineſs of the eye, at the ſame time it really produces great watchfulneſs. It is alſo conſidered as a great inſpirer of courage, or rather inſenſibility to danger; ſo that the commanders make no ſcruple of allowing large quantities of it to the ſoldiers when they are going to battle or engaged in any hazardous enterprize.

The beſt opium in the world is ſaid to come from Patna on the river Ganges, where, at leaſt, the greateſt traffic of it is made, and from whence it is exported all over India; though in ſome parts, eſpecially on the Malay coaſts, it is prohibited under pain of death, on account of the madneſs, and murders conſequent upon that madneſs, which are occaſioned by it; notwithſtanding which ſevere prohibition, however, it is plentifully ſmuggled into all theſe countries. —The ſoil about the Ganges is accounted beſt for producing the ſtrongeſt kinds of opium; of which the following remakable inſtance is related. "A nabob of theſe parts having invited an Engliſh factory to an entertainment, a young gentleman, a writer in the company's ſervice, ſauntering about the garden, plucked a poppy and ſucked the head of it. In conſequence of this he fell into a profound ſleep; of which the nabob being appriſed, and likewiſe informed of the particular bed out of which he had taken the flower, expreſſed his ſorrow; acquainting his friends at the ſame time that the poiſon was too ſtrong to admit of any remedy; which accordingly proved true, and the unfortunate gentleman never awaked."

 Opium

Opium applied externally is emollient, relaxing, and difcutient, and greatly promotes fuppuration: if long kept upon the fkin, it takes off the hair, and always occafions an itching in it; fometimes it exulcerates it, and raifes little bliflers if applied to a tender part. Sometimes on external application, it allays pain, and even occafions fleep: but it muft by no means be applied to the head, efpecially to the futures of the fkull; for it has been known to have the moft terrible effects in this application, and even to bring on death itfelf. It appears, too, from fome curious experiments made by Dr. Leigh, to act as the moft powerful of all ftyptics. "Having laid bare the crural artery of a rabbit (fays the doctor), I divided it, when the blood inftantly flew out with confiderable velocity; fome of a ftrong folution was then applied to the divided artery, the ends of which in a fhort fpace of time contracted, and the hæmorrhagy ceafed. The fame experiment was performed on the brachial artery with like fuccefs."

The effects of a ftrong folution of opium upon the heart, appears from the fame experiments to be very extraordinary. "I opened the thorax of a rabbit (fays the doctor), and by diffection placed the heart in full view; the aorta was then divided, and the animal bled till it expired. After the heart had remained motionlefs ten minutes, and every appearance of life had ceafed for the fame length of time, I poured on the heart a quantity of my ftrong folution; it was inftantly thrown into motion, which continued two minutes: I then added more of the folution, and the action was again renewed. By thus repeating my applications, the motions of the heart were fupported more than ten minutes. I afterwards opened the thorax of a rabbit, and, without doing any injury to the large blood-veffels, placed the heart in view. A quantity of my ftrong folution was then applied to it, which fo accelerated the motions as to render it impoffible to number them: by renewing the application, thefe were continued for fome confiderable time. The furface of the heart now appeared uncommonly red, and continued fo fome time." Opium contains gum, refin, effential oil, falt, and earthy matter; but its narcotic or fomniferous power has been experimentally found to refide in its effential oil.

THE VISION OF OSREIDAN.

OSREIDAN of Damafcus was a heretic of the fect of Kadir, who believe in the freedom of the human will, and that good works are effential to the attainment of future happinefs. Venerable for age and integrity, he was drawing nigh unto death. By the flow, yet progreffive and perceptible, decay of his vital powers, he felt his diffolution approaching. Affected, but not weakly affected, with the profpect of bidding adieu for ever to all earthly enjoyments, he retired into a lonely grove by the margin of the river Abana; and, confidering himfelf as foon about to appear in the prefence of Allah and his holy prophet, he pondered the paft events of his life. Solemn filence prevailed; the ftream flowed gently, and without any noife! the fhade from furrounding poplars became fo gloomy as to feem preternatural; veneration and awe feized the foul of Ofreidan. 'Holy Allah!' he exclaimed, 'before whom I am foon to appear, let my departure be tranquil, and may thy favour receive me!'

A fudden

A ſudden light beamed around him. It flowed from the ſnow-white raiment and ſhining treſſes of a ſpirit, that in the form of a man addreſſed him. "Be of good cheer!" ſaid the gentle viſitant; "I am thy genius, the guardian of thy life, the witneſs, and as far as was given me, and as far as the freedom of thy will permitted, the director of all thine actions. I have heard thy ſincere effuſion; and am commiſſioned, in conſideration of thine integrity, of thy piety, and of thy mercy, to animate at thy parting hour, and inſtruct, thy devotion. Lift up thy ſoul to the Ruler and Creator of all things; and pour out the tribute of thankſgiving *for all that has ever befallen thee*."

"Alas!" ſaid Oſreidan, "my heart recoils from that awful office. I have never hitherto, from ſervile fear, nor will I now, at the cloſe of life, diſguiſe the thoughts of my ſoul. I will not feign a gratitude I cannot feel; nor appear before my Judge and his holy prophet, with baſe proſtration, and the homage of lying lips. I will thank him for the good he has rendered me; for the cup of proſperity which I have held; for the robe of honour which I have worn; and theſe hoary locks of reverend old age: but I cannot thank him for evil."

The genius, with a ſmile of ſoftneſs, replied,—"No real evil has ever befallen thee."—"How!" anſwered Oſreidan, with ſurpriſe bordering on indignation; "when my ſon, my only child, the youthful and bold Albazan, whoſe ſtature was like mount Taurus; and whoſe fame ſaluted me, like the breath of Arabian odour; when Albazan periſhed, did I not feel as a father? and did I feel no pain?"—"Wouldſt thou not rather," ſaid the genius, "that thy ſon, unſeduced by corruption, and unaſſailed by diſgrace, ſhould have died in the morning of life extolled and lamented, than that he ſhould have ſuffered, in the noontide of his age, the infamy and the puniſhment due to enormous guilt?"—"Would Albazan," exclaimed the father; "would Albazan have ſtooped to guilt? His ſoul was pure as the empyreal ſky; and as the brilliant ſtars that diverſify its expanſe, were his numerous and ſplendid virtues."

"Tell me what thou beholdeſt," ſaid the friend of Oſreidan. He ſaw, in the ſpirit of viſion, a young man of prepoſſeſſing appearance. By the rapidity and intuition of the preternatural mood, he ſaw him aſcending the heights of Honour, diverſified as they ſeemed with groves, temples, triumphant arches, and obeliſks inſcribed with everlaſting characters.—He ſaw him aſſailed by a troop of Temptations. The phantoms were of various ſhapes, and their appearances ſhifting. They diſplayed to the ſprightly but devoted youth, cozened by magic ſpells, the pomp of illuſtrious attendance, the glare of the gorgeous banquet, the domes of the lofty palace, the ſeduction of ſmiling maids; they ſubdued and enſlaved him. For, deviating from his upward courſe, he followed his gay enticers, and deſcended imperceptibly into the mazes of Error. The winding path was bordered with ſhrubs and flowers; and was frequently darkened or overſhadowed with fragrant groves. Ever and anon he partook of the delicious fruit that from the neighbouring branches enticed him; but, inſtead of refreſhing, they made him weak, and brough ton an unquenchable thirſt. He then drank of a meandering ſtream that crept gently by him; but the muddy ſtream of Corruption, inſtead of relieving, rendered him ſtill more languid. He looked up with

a ſigh to the mountain of Honour; but he had ſtrayed ſo far around, that in his languor he could not think of returning; and the ſide now expoſed to his view was a rugged and unſurmountable precipice.

Faint and hopeleſs, he retired for reſpite to an adjoining tent, garniſhed with flaunting banners, and glittering with the unreal appearance of gold and precious ſtones. He knew not, alas! the receſs and the retirement of Falſehood. Reclining on ſilken couches, the couches of Vain Enjoyment, he drew around him curtains emboidered with various colours, the curtains of Self-deceit; and was lulled to repoſe by the tinkling cymbal of Folly. Short were the ſlumbers of his witleſs reſt: he was waked by the croaking of Infamy, a large and preternatural raven, whoſe hoarſe noiſe ſhook the rocks and the groves; and was preſently after devoured by an enormous crocodile, that had watched him as he entered the maze, and had lurked by the noiſeleſs ſtream.

"Thou beholdeſt," continued the genius, "the lot of thy lamented ſon, had not the angel of death, by the ſhaft of ſudden and unexpected diſtemper, prevented his guilty ſhame. Stupified by Diſſipation, and enſnared by Falſehood, he would not have been rouſed from his vicious indulgence, but by the peal of Infamy, and the gripe of Deſtruction. Sorrow for his crimes and his ſufferings would have blaſted the ſtrength of his father's mind, and rendered him incapable of virtuous exertion. Be thankful for the death of thy ſon!"

The aged cheek of Ofreidan was bathed in a flood of tears. He wept bitterly; and for a ſpace, the anguiſh of his grief was ſilent. At length, in interrupted accents,—"Why did I ever exiſt? Or why was I hailed with the name of father? But the will of Allah be done! He, whoſe arm is almighty, and whoſe bleſſedneſs is unimpaired, can never injure, nor without a cauſe afflict, the leaſt of his creatures. The will of Allah be done!"

The countenance of the genius was for a moment bedimmed; and his viſage ſeemed indiſtinct. But his form remained; and in an inſtant recovered its brightneſs. His eye was rekindled with the pureſt intelligence; and the ſmile that played on his lip was of the kindeſt benignity. He had withdrawn from Ofreidan, and had left aſſumed appearance behind him. With a celerity tranſcending all human conception, he had ariſen to the ſapphire throne; and had preſented himſelf, for farther inſtruction, before the Ancient of Days. He had then returned; re-animated his human appearance; and, reſuming his ſpeech in tones of ſoft conſolation, "I am permitted," he ſaid, "as the recompence of thy humility, of thy juſt, rational, and meek, reſignation, to reveal a part, ſo far at leaſt as thou art able to underſtand, of an awful myſtery.—Thy ſon was called into exiſtence for the diſcharge of important functions; and to ſhare, in proceſs of time, and after various changes, the ſupremeſt happineſs that man can enjoy—the happineſs ariſing from his powers and virtues. Some part of his office he has already performed; for he has afforded exerciſe to thoſe virtues of thine, which, by having been proved, and by having received their proper exerciſe, ſhall, in the ſequel, exalt thy nature. Having done ſo, and not having ſufficient powers to oppoſe the perils that muſt as thy ſon have aſſailed him, he he has been called, in conſideration of the merit he had already acquired, and by the mercy of Heaven, to the trials of a new condition. He is expoſed again to temptation. But aided by thy councils,

cils, and by the habits of early life, though he is at present unconscious of the sources from which his assistance flows, he has power to oppose them. He will thus acquire still higher endowments; and be enabled to combat even fiercer temptations, fiercer and more seducing than those which the vision shadowed.—Renovation of life, the reinstated memory of past events, renewal and increase of affection, in ways too mysterious for human conception, shall, in another state, be the portion of both father and son. For, to intelligent beings, death is not the close, but the means of awful and important variety in their mode of existence."

"But," said Ofreidan, emboldened by the condescension of his celestial friend, "could not this have been accomplished without the the smallest intermixture of evil?"—"What proportion," answered the genius, "what proportion can you establish between an instant of time, and a million of ages?—What proportion can you establish between the smallest drop of dew that hangs on the point of the finest needle employed by the maidens of Cashmer in the needle-work of their queen, and the waters of the mighty deep? Far less the proportion of the present life to the duration of future existence. Thy sufferings will vanish from thy remembrance as the white vapour on the breast of the sky dispersed by the blazing sun. Consider too, that if the suffering thou accountest painful, transient as it must seem, shall become the means of securing, exalting, and improving, the relish of thy future enjoyments, as the spices of Java improve the feast of the caliph, what thou pronouncest suffering is no longer to be accounted evil."

The genius disappeared. All remembrance of the facts and sayings that occurred in his visitation was instantly effaced from the mind of Ofreidan. He seemed to have had a vision; but could not tell what it was.—Yet its parting gleam had been bright and delightful. He felt its benign effects; for the remaining days of his life were soothed with complacency, with good will to mankind, consolation, and peace.

The writing of the vision was afterward revealed to the hermit of Carmel, who was also a Kadarite; and by him set forth in a book for the consolation and hope of the faithful.

THE VENTRILOQUIST.

VENTRILOQUISM is an art by which certain persons can so modify their voice, as to make it appear to the audience to proceed from any distance, and in any direction. Some faint traces of this art are to be found in the writings of the ancients; and it is the opinion of M. de la Chapelle, who in the year 1772 published an ingenious work on the subject, that the responses of many of the oracles were delivered by persons thus qualified to serve the purposes of priest-craft and delusion. As the ancient ventriloquists, when exercising their art, seemed generally to speak from their own bellies, the name by which they were designed was abundantly significant: but it is with no great propriety that modern performers are called *ventriloquists*, and their art *ventriloquism*, since they appear more frequently to speak from the pockets of their neighbours, or from the roof or distant corners of the room, than from their own mouths or their own bellies.

From

From Brodeau, a learned critic of the 16th century, we have the following account of the feats of a capital ventriloquift and cheat, who was valet de chambre to Francis I. The fellow, whofe name was Louis Brabant, had fallen defperately in love with a young, handfome, and rich, heirefs; but was rejected by the parents as an unfuitable match for their daughter, on account of the lownefs of his circumftances. The young lady's father dying, he made a vifit to the widow, who was totally ignorant of his fingular talent. Suddenly, on his firft appearance, in open day, in her own houfe, and in the prefence of feveral perfons who were with her, fhe heard herfelf accofted, in a voice perfectly refembling that of her dead hufband, and which feemed to proceed from above, exclaiming, "Give my daughter in marriage to Louis Brabant:—he is a man of great fortune, and of an excellent character. I now endure the inexpreffible torments of purgatory, for having refufed her to him. If you obey this admonition, I fhall foon be delivered from this place of torment. You will at the fame time provide a worthy hufband for your daughter, and procure everlafting repofe to the foul of your poor hufband."

The widow could not for a moment refift this dread fummons, which had not the moft diftant appearance of proceeding from Louis Brabant; whofe countenance exhibited no vifible change, and whofe lips were clofe and motionlefs, during the delivery of it. Accordingly, fhe confented immediately to receive him for her fon-in-law. Louis's finances, however, were in a very low fituation; and the formalities attending the marriage contract rendered it neceffary for him to exhibit fome fhow of riches, and not to give the ghoft the lie direct. He accordingly went to work upon a frefh fubject, one Cornu, an old and rich banker at Lyons; who had accumulated immenfe wealth by ufury and extortion, and was known to be haunted by remorfe of confcience on account of the manner in which he had acquired it.

Having contracted an intimate acquaintance with this man, he, one day while they were fitting together in the ufurer's little back parlour, artfully turned the converfation on religious fubjects, on demons and fpectres, the pains of purgatory, and the torments of hell. During an interval of filence between them, a voice was heard, which to the aftonifhed banker feemed to be that of his deceafed father, complaining, as in the former cafe, of his dreadful fituation in purgatory, and calling upon him to deliver him inftantly from thence, by putting into the hands of Louis Brabant, then with him, a large fum for the redemption of Chriftians then in flavery with the Turks; threatening him at the fame time with eternal damnation if he did not take this method to expiate likewife his own fins. The reader will naturally fuppofe that Louis Brabant affected a due degree of aftonifhment on the occafion; and farther promoted the deception, by acknowledging his having devoted himfelf to the profecution of the charitable defign imputed to him by the ghoft. An old ufurer is naturally fufpicious. Accordingly the wary banker made a fecond appointment with the ghoft's delegate for the next day; and, to render any defign of impofing upon him utterly abortive, took him into the open fields, where not a houfe, or a tree, or even a bufh, or a pit, were in fight, capable of fcreening any fuppofed confederate. This extraordinary caution excited the ventriloquift to

 exert

exert all the powers of his art. Wherever the banker conducted him, at every ſtep his ears were ſaluted on all ſides with the complaints and groans not only of his father, but of all his deceaſed relations, imploring him for the love of God, and in the name of every ſaint in the kalendar, to have mercy on his own ſoul, and theirs, by effectually ſeconding with his purſe the intentions of his worthy companion. Cornu could no longer reſiſt the voice of heaven, and accordingly carried his gueſt home with him, and paid him down 10,000 crowns; with which the honeſt ventriloquiſt returned to Paris, and married his miſtreſs.—The cataſtrophe was fatal. The ſecret was afterwards blown, and reached the uſurer's ears, who was ſo much affected by the loſs of his money, and the mortifying railleries of his neighbours, that he took to his bed and died.

This trick of Louis Brabant is even exceeded by an innocent piece of waggery played off not forty years ago by another French ventriloquiſt on a whole community. We have the ſtory from M. de la Chapelle, who informs us, that M. St. Gill the ventriloquiſt and his intimate friend, returning home from a place whither his buſineſs had carried him, ſought for ſhelter from an approaching thunderſtorm in a neighbouring convent. Finding the whole community in mourning, he inquired the cauſe, and was told that one of their body had died lately, who was the ornament and delight of the whole ſociety. To paſs away the time, he walked into the church, attended by ſome of the religious, who ſhewed him the tomb of their deceaſed brother, and ſpoke feelingly of the ſcanty honours they had beſtowed on his memory. Suddenly a voice was heard, apparently proceeding from the roof of the choir, lamenting the ſituation of the defunct in purgatory, and reproaching the brotherhood with their lukewarmneſs and want of zeal on his account. The friars, as ſoon as their aſtoniſhment gave them power to ſpeak, conſulted together, and agreed to acquaint the reſt of the community with this ſingular event, ſo intereſting to the whole ſociety. M. St. Gill, who wiſhed to carry on the joke ſtill farther, diſſuaded them from taking this ſtep; telling them that they would be treated by their abſent brethren as a ſet of fools and viſionaries. He recommended to them, however, the immediately calling of the whole community into the church, where the ghoſt of their departed brother might probably reiterate his complaints. Accordingly all the friars, novices, lay-brothers, and even the domeſtics of the convent, were immediately ſummoned and collected together. In a ſhort time the voice from the roof renewed its lamentation and reproaches, and the whole convent fell on their faces, and vowed a ſolemn reparation. As a firſt ſtep, they chanted a *De profundis* in a full choir; during the intervals of which the ghoſt occaſionally expreſſed the comfort he received from their pious exerciſes and ejaculations on his behalf. When all was over, the prior entered into a ſerious converſation with M. St. Gill; and, on the ſtrength of what had juſt paſſed, ſagaciouſly inveighed againſt the abſurd incredulity of our modern ſceptics and pretended philoſophers on the article of ghoſts or apparitions. M. St. Gill thought it now high time to undeceive the good fathers. This purpoſe, however, he found it extremely difficult to effect, till he had prevailed upon them to return with him into the church, and there

there be witnesses of the manner in which he had conducted this ludicrous deception.

A ventriloquist, who performed feats somewhat similar to these, lately made his appearance in many parts of England and Scotland. He imitated successfully the voice of a squeaking child, and made it appear to proceed from whatever place he chose; from the pockets of the company, from a wooden doll, with which he held many spirited conversations; from beneath a hat or a wine-glass, and out of any person's foot or hand. When the voice seemed to come from beneath a glass or hat, it was dull and on a low key, as sounds confined always are; and what evinced his dexterity was, that, when the glass was raised from the table during the time of his speaking, the words or syllables uttered afterwards were on a higher key, in consequence, one would have thought, of the air being re-admitted to the speaker. This part of the experiment failed, however, when the management of the glass was at a distance committed to any of the company; but, as the room was not well illuminated, we are inclined to attribute this failure to the ventriloquist's not being able to perceive at what precise instant of time the glass was removed from the table. The same artist imitated the tones of a scolding old woman, disturbed at unseasonable hours by a person demanding admission into her house; but this exhibition did not appear masterly. The tones of the old woman and the child were not accurately discriminated: the child was a young scold, and the scold spoke like an angry child. We have heard that the same practitioner astonished a number of persons in a fish-market, by making a fish appear to speak, and give the lie to its vender, who affirmed that it was fresh, and caught in the morning; and, whether this fact was really performed or not, we cannot doubt, from what we saw and heard him do, but that he was fully equal to its performance.

This ventriloquist was an illiterate man; and, though sufficiently communicative, could not make intelligible the manner in which he produced these acoustic deceptions. Yet the speculative principles on which it is founded must be obvious to every man who has studied the philosophy of the human mind, and has ever witnessed the feats of mimickry. It is certain that, previous to experience, we could not refer sound to any external cause; it does not therefore give immediate indication of the place or distance of the sonorous body; hence it is only by the association of place with sound that the latter becomes an indication of the former. This being admitted, nothing seems requisite to fit a man for becoming an expert ventriloquist but a delicate ear, flexibility of the organs of speech, and long practice of those rules which repeated trials would enable him to discover. A delicate ear perceives every difference which change of place produces in the same sound; and, if a person possessed of such an ear have sufficient command over his organs of speech, to produce by them a sound in all respects similar to another proceeding from any distant object, it is evident that to the audience the sound which he utters must appear to proceed from that object. If this be the true theory of ventriloquism, it does not seem to be possible for the most expert ventriloquist to speak in his usual tones of conversation, and at the same time make the voice appear to come from a distance; for these tones must be supposed familiar to his audience, and to be in their minds associated with the ideas of his figure, place, and distance.

tance. Hence the ventriloquift whom we faw appeared to fpeak from various places only in the tones of the fqueaking child, while Louis Brabant and M. St. Gille, in their great feats, imitated the voices of ghofts, to which no man could be familiar, and where terror would greatly contribute to the deception. There can, however, be no doubt, but that if, by a peculiar modification of the organs of fpeech, a found of any kind can be produced, which in faintnefs, tone, body, and in fhort every other fenfible quality, perfectly refembles a found delivered from the roof of an oppofite houfe; the ear will naturally, without examination, refer it to that fituation and diftance, the found which the perfon hears being only a fign, which he has from his infancy been conftantly accuftomed, by experience, to affociate with the idea of a perfon fpeaking from a houfe-top. It is evident too, that, when there is no particular ground of fufpicion, any fmall difparity between the two founds will not be perceptible. But if our theory be juft, that experience or habit which mifleads a perfon who has feldom heard the ventriloquift, and is a ftranger to his powers, at length fets another perfon right who is acquainted with them, and has been a frequent witnefs of their effects. This was actually the cafe of M. de la Chapelle, with whom the illufion at length ceafed, in confequence of repeated vifits to M. St. Gille: fo that while others, ignorant of his talent, and poffeffed only of their old or habitual experience with regard to articulate founds, confidered his voice as coming from the top of a tree, or from a deep cellar under ground; our author, well acquainted with the powers of the ventriloquift, and having acquired a new kind of experience, at once referred it directly to the mouth of the fpeaker.

REMARKS ON THE PECULIAR EXCELLENCIES IN HANDEL's MUSIC.

HANDEL's mufic, particularly his oratorios, being ftill annually and occafionally performed in London and elfewhere, it may not be incurious to enquire from what caufes this conftant repetition arifes, and why the works of this mafter have had a fate fo very different from that of contemporary compofers, the greateft part of which feems configned to oblivion.

This inquiry will naturally lead to the fpeaking of general principles, fo far as they are applicable to the prefent fubject; to the ftate of inftrumental and vocal mufic; and to a comparifon between Handel and other compofers of note which flourifhed at this period. Nothing more being intended than a few mifcellaneous obfervations fet down juft as they occur, method will not be attempted, and of courfe muft be excufed.

As the compofitions which are the fubject of the following remarks were produced in England, and fet to Englifh words, the mention of foreign muficians, and their works, is excluded, as not appertaining to the fubject, unlefs fo connected with it as to render the mention indifpenfable.

Mufic, in its common application, is confidered merely as an entertainment: when bad, it difgufts; when good, it creates fenfations unknown from other fources; and, if it reach the fublime, our feel-

ings are more powerfully excited than from the utmoſt perfection that poetry alone, or painting, has yet attained.

With the latter, muſic cannot be connected: but when joined, or, as Milton phraſes it, *wedded* with poetry, it reaches the higheſt pitch of excellence, and ſoars a height which, disjoined from its powerful ally, was impoſſible to be obtained.

Before Handel, we cannot recollect any inſtance of this perfection. Our beſt vocal muſic was in the church, and our beſt compoſers were Purcel, Wiſe, Weldon, and, a little later, Croft, whoſe merit, as far as it reached, will be ever felt and acknowledged.

Inſtrumental muſic was, perhaps, univerſally barbarous until the time of Corelli, whoſe compoſitions ſeemed to open a new world. Even in theſe our times, when inſtrumental muſic is ſo much improved, Corelli is ſtill a favourite, and not only with old-faſhioned people. The reaſon why he is ſo, would carry me too far from my ſubject. What Corelli did for bow-inſtruments, Handel did for the harpſichord. We acknowledge the improvements of our modern ſymphoniſts, but we ſtill reliſh a concerto of Corelli, and no great performer on the harpſichord but ſits down with pleaſure to the *Suites des Pieces pour le Claveein.*

The muſic for the ſtage was thoroughly wretched, and continued ſo until the little muſical entertainments of Carey and the Beggar's Opera, which made their appearance long after the time of Handel's firſt reſidence in England. Such was the ſtate of our muſic at the beginning of this century, and long after.

What are called Handel's Hautbois Concertos have ſo much ſubject, real air, and ſolid compoſition, that they always are heard with the greateſt pleaſure, and are undoubtedly the beſt things of their claſs. We believe they were the firſt attempt to unite wind-inſtruments with violins, which union was long reprobated in Italy.

The operas of Handel are confeſſedly ſuperior to all preceding and contemporary ones. His oratorios, though called by a well-known name, may be juſtly eſteemed original, both in deſign and execution. Theſe laſt being the pieces which are ſo frequently performed, we ſhall, with the utmoſt impartiality, conſider their merits and defects, and how far they deſerve their continued approbation.

Any works of a faſhionable compoſer, eſpecially if exhibited by performers we are in the habit of applauding, will take a preſent hold on our attention, to the excluſion of works of ſuperior merit not poſſeſſing the ſame advantages; but, when they have had their day, they ſet to riſe no more. On the contrary, thoſe compoſitions which depend on their own intrinſic merit may make their way ſlowly, or perhaps, by being cut off from a poſſibility of taking the firſt ſtep, may never get forward at all; yet, if once they are preſented to the public, and their effect felt and underſtood, they are always heard with new pleaſure, and claim an equal immortality with poetry and painting. Let us conſider what are the eſſentials of good muſic, and how far Handel's compoſitions poſſeſs them.

The firſt eſſential (and without which all others are of no conſequence) is what in popular muſic is called tune; in more refined, is denominated air; and, in the ſuperior claſs of compoſition, ſubject. Muſic, having this property alone, is entitled to a long exiſtence, and poſſeſſes it. The next eſſential is harmony, the ſtrongeſt ally by which air can be aſſiſted, but which receives from air more conſequence

quence than it communicates. To these must be added expression, giving a grace to the former; and facility, which has the effect of immediate emanation, and, as the term imports, seems to accomplish with ease what from its apparent difficulty should be rather sought for than found.

If words are to be connected with music, they ought like that to be light and airy for tune, passionate for air, and both passionate and sublime for subject; but in every case (except particular applications) must appeal to the heart. The accent and emphasis must be expressed, and whatever effect the reading of the words is to produce must be increased by the music.

There are but few examples of Handel's possessing tune in the popular sense. He seldom is without air in its most refined application, and most commonly has an exuberance of subject for greater purposes. His harmony is in general well-chosen and full; his expression sometimes faulty, but frequently just; and his facility great from so much practice, sinking now and then to carelessness.

In consequence of this general character, we find no songs of his in the style of Carey's tunes and the real English ballad. Most of his oratorio and opera songs have air in them, some very fine. His chorusses are as yet unrivalled, and those form the broad base on which his fame is built. They possess subject and contrivance, frequently expression, and most commonly facility, altogether producing a superior effect to any other chorusses yet known to the public. Their great number and variety shew his invention, that strong criterion of genius. It will be found to hold true as a general remark, that, where the words are most sublime, the composition has most subject and expression; and this ought to be considered by those who hold words of no consequence: if they have no other than exalting the fancy of the composer, (which effect they certainly produce,) we should, for the sake of music, independently considered, make choice of works of imagination.

Besides the advantages of superior genius and knowledge, Handel possessed another, without which his genius and knowledge might have remained for ever unknown. He had an opportunity of presenting his works to the public, performed by the best band of the times, and of repeating his pieces until they were understood, and their superior merit felt. By these means they were impressed upon the mind, and at last became so congenial to our feelings, as almost to exclude the possibility of other music being performed.

Handel's music, then, having the great essentials of genius, skill, and facility, and being at first performed often enough to have its intention comprehended, and its merit felt and acknowledged, it necessarily keeps possession of the public favour, and its annual performance is expected with pleasure, and always considered as an entertainment of a superior kind.

After this unequivocal praise, we may venture to point out what appear to be defects in this great musician. The first thing that an enlightened modern composer would notice, is an inattention to the *sort* of the different instruments, more particularly apparent in the parts for trumpets and other wind-instruments, which in general lie awkward and unkindly. At the time we acknowledge this, we should remark, that in those days such niceties did not exist, for they are some of the real improvements of modern music. Handel's con-

certoes and choruſſes, without the leaſt alteration of harmony or melody in the ſubject (as every real muſician well knows), might be improved in this point, and produce a very ſuperior and increaſed effect.

Of the ORIGIN of OMENS.

AN Omen ſignifies a ſign or indication of ſome future event, taken from the language of a perſon ſpeaking without any intent to prophecy. Hence Tully ſays, " Pythagorei non ſolum voces deorum obſervarunt, ſed etiam hominum, quæ vocent *omina* ;" " the Pythagoreans attend to the diſcourſe not only of gods, but alſo of men, which they call *omens.*" This ſort of omen was ſuppoſed to depend much upon the will of the perſon concerned in the event ; whence the phraſes *accepit omen, arripuit omen.* Such were the original *omens* ; but they were afterwards derived from *things* as well as from words. Thus Paterculus, ſpeaking of the head of Sulpicius on the roſtrum, ſays, it was *velut omen imminentis proſcriptionis,* " the omen of an impending proſcription." Suetonius ſays of Auguſtus, that he believed implicitly in cerain omens ; and that, *ſi mane ſibi calceus perperam, ac ſiniſter pro dextero induceretur, ut dirum,* " if his ſhoes were improperly put on in the morning, eſpecially if the left ſhoe was put upon his right foot, he held it for a bad omen." Omen was uſed in a ſtill larger ſenſe, to ſignify an *augury* ; as in the following line of Tully : " Sic aquilæ clarum firmavit Jupiter *omen* ;" " thus Jove confirmed the bright omen of the eagle." It was laſtly uſed, in the moſt generic ſenſe of all, for a portent or prodigy ; as in the third book of the Æneid, where a myrtle torn up by Æneas dropped blood. Upon this appearance, ſays the hero,

———— Mihi frigidus horror
Membra quatit, gelidusque coit formidine ſanguis.

And, the ſame thing being repeated upon his breaking a branch from another tree, he prayed to the gods to avert the *omen :*

Multa movens animo Nymphas venerabar agreſtes,
Gradivumque patrem, Geticis qui præſidet arvis,
Rite ſecundarent viſus, *omen* que levarent.

Inſtead of tranſlating theſe ſhort quotations, we ſhall here give Dryden's verſion of the whole of this portentous adventure ; as we are perſuaded that the mere Engliſh reader, who alone can wiſh for a tranſlation, will be glad to have the fulleſt account of the bleeding myrtle, together with its effects on the mind of the hero. It is as follows :

Not far, a riſing hillock ſtood in view ;
Sharp myrtles on the ſides and corners grew.
There, while I went to crop the ſylvan ſcenes,
And ſhade our altar with their leafy greens,
I pull'd a plant (with horror I relate
A prodigy ſo ſtrange, and full of fate) :
The rooted fibres roſe ; and from the wound
Black bloody drops diſtill'd upon the ground.
Mute and amaz'd, my hair with terror ſtood ;
Fear ſhrunk my ſinews, and congeal'd my blood.

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Mann'd once again, another plant I try;
That other guſh'd with the ſame ſanguine dye.
Then, fearing guilt for ſome offence unknown,
With prayers and vows the Dryads I atone,
With all the ſiſters of the woods, and moſt
The god of arms, who rules the Thracian coaſt:
That they, or he, theſe omens would avert,
Releaſe our fears, and better ſigns impart.

Theſe portentous or ſupernatural omens were either external or internal. Of the former ſort were thoſe ſhowers of blood ſo frequently occurring in the Roman hiſtory, which were much of the ſame nature with this adventure of Æneas, which he calls MONSTRA DEUM. Of the ſecond ſort were thoſe ſudden conſternations, which, ſeizing upon men without any viſible cauſe, were imputed to the agency of the god *Pan*, and hence called *panic fears*. But indeed there was hardly any thing, however trivial, from which the ancients did not draw omens. That it ſhould have been thought a direful omen when any thing befel the temples, altars, or ſtatues of the GODS, need excite no wonder; but that the meeting of a eunuch, a negro, a bitch with whelps, or a ſnake lying in the road, ſhould have been looked upon as portending bad fortune, is a deplorable inſtance of human weakneſs, and of the pernicious influence of ſuperſtition on the mind.

It is more than probable that this practice of making ordinary events ominous of good or bad fortune took its riſe in Egypt, the parent country of almoſt every ſuperſtition of paganiſm; but wherever it may have ariſen, it ſpreads itſelf over the whole inhabited globe, and at this day prevails in a greater or leſs degree among the vulgar of all nations. In England, it is reckoned a good omen, or a ſign of future happineſs, if the ſun ſhines on a couple coming out of the church after having been married. It is alſo eſteemed a good ſign if it rains whilſt a corpſe is burying:

Happy is the bride that the ſun ſhines on;
Happy is the corpſe that the rain rains on.

To break a looking-glaſs is extremely unlucky; the party to whom it belongs will loſe his beſt friend. If, going a journey on buſineſs, a ſow croſs the road, you will probably meet with a diſappointment, if not a bodily accident, before you return home. To avert this, you muſt endeavour to prevent her croſſing you; and, if that cannot be done, you muſt ride round on freſh ground. If the ſow is attended with her litter of pigs, it is lucky, and denotes a ſucceſsful journey. It is unlucky to ſee, firſt one magpye, and then more; but to ſee two, denotes marriage or merriment; three, a ſucceſsful journey; four, an unexpected piece of good news; five, you will ſhortly be in a great company. To kill a magpye, will certainly be puniſhed with ſome terrible misfortune.

If, in a family, the youngeſt daughter ſhould be married before her elder ſiſters, they muſt all dance at her wedding without ſhoes: this will counteract their ill luck, and procure them huſbands. If you meet a funeral proceſſion, or one paſſes by you, always take off your hat; this keeps all evil ſpirits attending the body in good humour.

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If, in eating, you miſs your mouth, and the victuals fall, it is very unlucky, and denotes approaching ſickneſs. It is lucky to put on a ſtocking the wrong ſide outwards: changing it alters the luck. When a perſon goes out to tranſact any important buſineſs, it is lucky to throw an old ſhoe after him. It is unlucky to preſent a knife, ſciſſars, razor, or any ſharp or cutting inſtrument, to one's miſtreſs or friend, as they are apt to cut love and friendſhip. To avoid the ill effects of this, a pin, a farthing, or ſome trifling recompenſe, muſt be taken. To find a knife or razor, denotes ill luck and diſappointment to the party.

In the Highlands of Scotland, it is thought unlucky if a perſon ſetting out upon a journey ſtumble over the threſhold, or be obliged to return for any thing forgotten. If a ſportſman ſee any perſon ſtepping over his gun or fiſhing-rod, he expects but little ſucceſs in that day's diverſion. Sneezing is alſo deemed ominous. If one ſneeze when making a bed, a little of the ſtraw or heath is taken out and thrown into the fire, that nothing may diſturb the reſt of the perſon who is to ſleep in the bed. Among the ſame people, ſucceſs in any enterprize is believed to depend greatly upon the firſt creature that preſents itſelf after the enterprize is undertaken. Thus, upon going to ſhoot, it is reckoned lucky to meet a horſe, but very unfortunate to ſee a hare, if ſhe eſcape; and, upon meeting any creature deemed unlucky, the beſt means of averting the omen is to roll a ſtone towards it. The Greeks attributed the ſame efficacy to the rolling of a ſtone, though they greatly preferred killing the ominous animal, that the evil portended might fall on its own head.

The motions and appearances of the clouds were not long ago conſidered as certain ſigns by which the ſkilful Highlander might attain to the knowledge of futurity. On the evening before New-year's Day, if a black cloud appeared in any part of the horizon, it was thought to prognoſticate a plague, a famine, or the death of ſome great man in that part of the country over which it ſhould appear to ſit; and, in order to aſcertain the place threatened by the omen, the motions of this cloud were often watched through the whole night, if it happened to continue ſo long viſible above the horizon. By the believers in this ſuperſtition, there are days, as well as words and events, which are deemed ominous of good or bad fortune. The firſt day of every quarter, Midſummer, and New-year's Day, are reckoned the moſt fortunate days in the year for accompliſhing any deſign. In the Iſle of Mull, ploughing, ſowing, and reaping, are always begun on Tueſday, though the moſt favourable weather for theſe purpoſes be in this way frequently loſt. That day of the week on which the third of May falls is deemed unlucky throughout the whole year. In Morven, none will upon any account dig peat or turf for fuel on Friday; and it is reckoned unlucky to number the people or cattle belonging to any family, and doubly ſo if the number be taken on Friday. The age of the moon is alſo much attended to by the vulgar Highlanders. It is alleged, that during the increaſe things have a tendency to grow and ſtick together; and hence, in the Iſle of Sky, fences, which are there made of turf, are built only at that time; whilſt turf or peats for fuel are never, even in the moſt favourable weather, either made or ſtacked up but while the moon is in its wane. An opinion prevails

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in some places, that, if a house take fire during the increase of the moon, the family to which it belongs will prosper in the world; but that, if the fire happen while the moon is in the decrease, the family will from that time decline in its circumstances, and sink into poverty. In attributing such influence to the moon, the superstitious Highlanders have the honour to agree with the philosophic Virgil, who in his Georgics gives the following sage instructions to the husbandman:

Ipsa dies alios dedit ordine Luna
Felices operum. Quintam fuge:
* * * *
Septima post decimam felix et ponere vitem,
Et prensos domitare boves, et licia telæ
Addere: nona fugæ melior, contraria furtis.

The lucky days in each revolving moon
For labour choose: the *fifth* be sure to shun.
* * * *
The *seventh* is next the *tenth*, the best to join
Young oxen to the yoke, and plant the vine.
Then, weavers, stretch your stays upon the waft:
The *ninth* is good for travel, bad for theft.

DRYDEN.

From this coincidence of the superstition of the Roman poet with that of the natives of Mull and Morven, we are strongly inclined to adopt the hypothesis of the gentleman who favoured us with this accurate account of Highland omens. He justly observes, that this superstitious practice of auguring good or ill from trifling events, and from the particular phases of the moon, has no connection whatever with popish priestcraft: he shews that the Romish clergy, even in the darkest age, were at pains to eradicate it as idle and impious; and he therefore infers, that it must be a relic of Druidism handed down by tradition from an era prior to the introduction of Christianity into the Highlands and isles of Scotland. That the Druids were acquainted with the particular doctrines of Pythagoras has been clearly proved; that Virgil was no stranger to the Pythagorean philosophy is known to every scholar; that Pythagoras and his followers were addicted to the dotages of Magic has been likewise demonstrated; and therefore it appears to us probable at least, that the attention paid to pretended omens, not only in the Highlands, but also in the low country of Scotland, and indeed among the vulgar in every country of Europe, is a remnant of one of the many superstitions which the Druids imposed upon their deluded followers. That it is contrary to every principle of sound philosophy, all philosophers will readily acknowledge; and whoever has studied the writings of St. Paul must be convinced that it is inconsistent with the spirit of genuine Christianity.

INFLUENCE OF THE PASSIONS ON THE HUMAN MIND.

SO intimately are our perceptions, passions, and actions, connected, it would be wonderful if they should have no mutual influence. That our actions are too much influenced by passion, is a known truth;

truth; but it is not lefs certain, though not fo well known, that paffion hath alfo an influence upon our perceptions, opinions, and belief. For example, the opinions we form of men and things are generally directed by affection:—An advice given by a man of figure hath great weight; the fame advice from one in a low condition is defpifed or neglected: a man of courage under-rates danger; and to the indolent the flighteft obftacle appears unfurmountable. All this may be accounted for by the fimple principle of affociation.

There is no truth more univerfally known, than that tranquillity and fedatenefs are the proper ftate of mind for accurate perception and cool deliberation; and for that reafon, we never regard the opinion even of the wifeft man, when we difcover prejudice or paffion behind the curtain. Paffion hath fuch influence over us, as to give a falfe light to all its objects. Agreeable paffions prepoffefs the mind in favour of their objects; and difagreeable paffions, not lefs againft their objects:—A woman is all perfection in her lover's opinion, while in the eye of a rival beauty fhe is aukward and difagreeable: when the paffion of love is gone, beauty vanifhes with it;—nothing is left of that genteel motion, that fprightly converfation, thofe numberlefs graces, which formerly, in the lover's opinion, charmed all hearts. To a zealot every one of his own fect is a faint, while the moft upright of a different fect are to him children of perdition: the talent of fpeaking in a friend, is more regarded than prudent conduct in any other. Nor will this furprize any one acquainted with the world; our opinions, the refult frequently of various and complicated views, are commonly fo flight and wavering, as readily to be fufceptible of a bias from paffion.

With that natural bias another circumftance concurs, to give paffion an undue influence on our opinions and belief; and that is a ftrong tendency in our nature to juftify our paffions as well as our actions, not to others only, but even to ourfelves. That tendency is peculiarly remarkable with refpect to difagreeable paffions: by its influence, objects are magnified or leffened, circumftances fupplied or fuppreffed, every thing coloured and difguifed, to anfwer the end of juftification. Hence the foundation of felf-deceit, where a man impofes upon himfelf innocently, and even without fufpicion of a bias.

We fhall proceed to illuftrate the foregoing obfervations by proper examples.

Gratitude, when warm, is often exerted upon the children of the benefactor; efpecially where he is removed out of reach by death or abfence. The paffion in this cafe, being exerted for the fake of the benefactor, requires no peculiar excellence in his children: but the practice of doing good to thefe children produces affection for them, which never fails to advance them in our efteem. By fuch means, ftrong connections of affection are often formed among individuals, upon the flight foundation now mentioned.

Envy is a paffion, which, being altogether unjuftifiable, cannot be excufed but by difguifing it under fome plaufible name. At the fame time, no paffion is more eager than envy to give its object a difagreeable appearance: it magnifies every bad quality, and fixes on the moft humbling circumftances:

Cassius. I cannot tell what you and other men
Think of this life; but, for my fingle felf,
I had as lief not be, as live to be

I

In awe of such a thing as I myself.
I was born free as Cæsar, so were you;
We both have fed as well; and we can both
Endure the winter's cold as well as he.
For once, upon a raw and gusty day,
The troubled Tyber chafing with his shores,
Cæsar says to me, Dar'st thou, Cassius, now
Leap in with me into this angry flood,
And swim to yonder point?—Upon the word,
Accoutred as I was, I plunged in,
And bid him follow; so indeed he did.
The torrent roar'd, and we did buffet it
With lusty sinews; throwing it aside,
And stemming it with hearts of controversy.
But, ere we could arrive the point propos'd,
Cæsar cry'd, Help me, Cassius, or I sink.
I, as Æneas, our great ancestor,
Did from the flames of Troy upon his shoulder
The old Anchises bear; so from the waves of Tyber
Did I the tired Cæsar: and this man
Is now become a god; and Cassius is
A wretched creature, and must bend his body
If Cæsar carelessly but nod on him.
He had a fever when he was in Spain;
And, when the fit was on him, I did mark
How he did shake. 'Tis true, this god did shake;
His coward lips did from their colour fly;
And, that same eye whose bend doth awe the world
Did lose its lustre: I did hear him groan;
Ay, and that tongue of his, that bade the Romans
Mark him, and write his speeches in their books,
Alas! it cry'd—Give me some drink, Titinius,—
As a sick girl. Ye gods, it doth amaze me,
A man of such a feeble temper should
So get the start of the majestic world,
And bear the palm alone. JULIUS CÆSAR, act. 1. sc. 3.

Glo'ster, inflamed with resentment against his son Edgar, could even force himself into a momentary conviction that they were not related:

'O strange fasten'd villain!
Would he deny his letter?—I never got him.
KING LEAR, act 2. sc. 3.

When by great sensibility of heart, or other means, grief becomes immoderate, the mind, in order to justify itself, is prone to magnify the cause; and if the real cause admit not of being magnified, the mind seeks a cause for its grief in imagined future events;

BUSBY. Madam, your majesty is much too sad:
You promis'd, when you parted with the king,
To lay aside self-harming heaviness,
And entertain a cheerful disposition.
QUEEN. To please the king, I did; to please myself,
I cannot do it. Yet I know no cause

Why I ſhould welcome ſuch a gueſt as grief ;
Save bidding farewell to ſo ſweet a gueſt
As my ſweet Richard : yet again, methinks,
Some unborn ſorrow, ripe in Fortune's womb,
Is coming tow'rd me ; and my inward ſoul
With ſomething trembles, yet at nothing grieves,
More than with parting from my lord the king.
RICHARD II. act 2. ſc. 5.

Reſentment at firſt is vented on the relations of the offender, in order to puniſh him : but as reſentment, when ſo outrageous, is contrary to conſcience, the mind, to juſtify its paſſion, is diſpoſed to paint theſe relations in the blackeſt colours ; and it comes at laſt to be convinced, that they ought to be puniſhed for their own demerits.

Anger, raiſed by an accidental ſtroke upon a tender part of the body, is ſometimes vented upon the undeſigning cauſe. But as the paſſion in that caſe is abſurd, and as there can be no ſolid gratification in puniſhing the innocent, the mind, prone to juſtify as well as to gratify its paſſion, deludes itſelf into a conviction of the action's being voluntary. The conviction, however, is but momentary ; the firſt reflection ſhews it to be erroneous : and the paſſion vaniſheth almoſt inſtantaneouſly with the conviction. But anger, the moſt violent of all paſſions, has ſtill greater influence : it ſometimes forces the mind to perſonify a ſtock or a ſtone if it happen to occaſion bodily pain, and even to believe it a voluntary agent, in order to be a proper object of reſentment. And that we have really a momentary conviction of its being a voluntary agent, muſt be evident from conſidering, that without ſuch conviction the paſſion can neither be juſtified nor gratified : the imagination can give no aid ; for a ſtock or a ſtone, imagined inſenſible, cannot be an object of puniſhment, if the mind be conſcious that it is an imagination merely without any reality. Of ſuch perſonification, involving a conviction of reality, there is one illuſtrious inſtance. When the firſt bridge of boats over the Helleſpot was deſtroyed by a ſtorm, Xerxes fell into a tranſport of rage ſo exceſſive, that he commanded the ſea to be puniſhed with three hundred ſtripes ; and a pair of fetters to be thrown into it, enjoining the following words to be pronounced : " O thou ſalt and bitter water ! thy maſter hath condemned thee to this puniſhment for offending him without cauſe ; and is reſolved to paſs over thee in deſpite of thy inſolence : with reaſon all men neglect to ſacrifice to thee, becauſe thou art both diſagreeable and treacherous."

Shakeſpear exhibits beautiful examples of the irregular influence of paſſion in making us believe things to be otherwiſe than they are. King Lear, in his diſtreſs, perſonifies the rain, wind, and thunder ; and, in order to juſtify his reſentment, believes them to be taking part with his daughters :

LEAR. Rumble thy bellyful, ſpit fire, ſpout rain !
Nor rain, wind, thunder, fire, are my daughters.
I tax not you, ye elements, with unkindneſs ;
I never gave you kingdoms, call'd you children ;
You owe me no ſubſcription. Then let fall
Your horrible pleaſure.—Here I ſtand, your brave ;
A poor, infirm, weak, and deſpis'd, old man !
But yet I call you ſervile miniſters,

That

That have with two pernicious daughters join'd
Your high-engender'd battles 'gainſt a head
So old and white as this. Oh! oh! 'tis foul! Act. 3. ſc. 2.

King Richard, full of indignation againſt his favourite horſe for carrying Bolingbroke, is led into the conviction of his being rational:

GROOM. Oh! how it yearn'd my heart, when I beheld
In London ſtreets, that coronation-day,
When Bolingbroke rode on Roan Barbary,
That horſe that thou ſo often haſt beſtrid,
That horſe that I ſo carefully have dreſs'd.
K. RICH. Rode he on Barbary? tell me, gentle friend,
How went he under him?
GROOM. So proudly as he had diſdain'd the ground.
K. RICH. So proud that Bolingbroke was on his back!
That jade had eat bread from my royal hand.
This hand hath made him proud with clapping him.
Would he not ſtumble? would he not fall down,
(Since pride muſt have a fall,) and break the neck
Of that proud man that did uſurp his back?
RICHARD II. act 5. ſc. 11.

Hamlet, ſwelled with indignation at his mother's ſecond marriage, was ſtrongly inclined to leſſen the time of her widowhood, the ſhortneſs of the time being a violent circumſtance againſt her; and he deludes himſelf by degrees into the opinion of an interval ſhorter than the real one:

HAMLET.——————That it ſhould come to this!
But two months dead! nay, not ſo much; not two—
So excellent a king, that was, to this,
Hyperion to a ſatyr: ſo loving to my mother,
That he permitted not the wind of heav'n
Viſit her face too roughly. Heav'n and earth!
Muſt I remember—why, ſhe would hang on him,
As if increaſe of appetite had grown
By what it fed on: yet, within a month——
Let me not think—Frailty, thy name is *Woman!*
A little month! or ere thoſe ſhoes were old,
With which ſhe follow'd my poor father's body,
Like Niobe, all tears——why ſhe, ev'n ſhe—
(O heav'n! a beaſt, that wants diſcourſe of reaſon,
Wou'd have mourn'd longer) married with mine uncle,
My father's brother; but no more like my father
Than I to Hercules. Within a month!—
Ere yet the ſalt of moſt unrighteous tears
Had left the fluſhing in her galled eyes,
She married——Oh, moſt wicked ſpeed! to poſt
With ſuch dexterity to inceſtuous ſheets!
It is not, nor it cannot, come to good,
But break, my heart, for I muſt hold my tongue.
Act. 1. ſc. 3.

The power of paſſion to falſify the computation of time is remarkable in this inſtance; becauſe time, which hath an accurate

 meaſure,

meaſure, is leſs obſequious to our deſires and wiſhes than objects which have no preciſe ſtandard of leſs or more.

Good news are greedily ſwallowed upon very ſlender evidence; our wiſhes magnify the probability of the event, as well as the veracity of the relater; and we believe as certain what at beſt is doubtful. For the ſame reaſon, bad news gain alſo credit upon the ſlighteſt evidence: fear, if once alarmed, has the ſame effect with hope, to magnify every circumſtance that tends to conviction. Shakeſpeare, who ſhews more knowledge of human nature than any of our philoſophers, hath in his Cymbeline repreſented this bias of the mind; for he makes the perſon, who alone was affected with the bad news, yield to evidence that did not convince any of his companions. And Othello is convinced of his wife's infidelity from circumſtances too ſlight to move any perſon leſs intereſted.

If the news intereſt us in ſo low a degree as to give place to reaſon, the effect will not be altogether the ſame: judging of the probability of the ſtory, the mind ſettles in a rational conviction either that it is true or not. But even in that caſe, the mind is not allowed to reſt in that degree of conviction which is produced by rational evidence: if the news be in any degree favourable, our belief is raiſed by hope to an improper height; and, if unfavourable, by fear.

This obſervation holds equally with reſpect to future events: if a future event be either much wiſhed or dreaded, the mind never fails to augment the probability beyond truth.

That eaſineſs of belief, with reſpect to wonders and prodigies, even the moſt abſurd and ridiculous, is a ſtrange phenomenon; becauſe nothing can be more evident than the following propoſition, That, the more ſingular any event is, the more evidence is required to produce belief: a familiar event daily occurring, being in itſelf extremely probable, finds ready credit, and therefore is vouched by the ſlighteſt evidence; but to overcome the improbability of a ſtrange and rare event, contrary to the courſe of nature, the very ſtrongeſt evidence is required. It is certain, however, that wonders and prodigies are ſwallowed by the vulgar, upon evidence that would not be ſufficient to aſcertain the moſt familiar occurrence. It has been reckoned difficult to explain that irregular bias of mind; but we are now made acquainted with the influence of paſſion upon opinion and belief; a ſtory of ghoſts or fairies, told with an air of gravity and truth, raiſeth an emotion of wonder, and perhaps of dread; and theſe emotions, impoſing on a weak mind, impreſs upon it a thorough conviction contrary to reaſon.

Opinion and belief are influenced by propenſity as well as by paſſion. An innate propenſity is all we have to convince us that the operations of nature are uniform: influenced by that propenſity, we often raſhly think, that good or bad weather will never have an end; and in natural philoſophy, writers, influenced by the ſame propenſity, ſtretch commonly their analogical reaſonings beyond juſt bounds.

Opinion and belief are influenced by affection as well as by propenſity. The noted ſtory of a fine lady and a curate viewing the moon through a teleſcope is a pleaſant illuſtration: "I perceive (ſays the lady) two ſhadows inclining to each other; they are certainly two happy lovers:" "Not at all (replies the curate), they are two ſteeples of a cathedral."

Among

Among the particulars that compose the social part of our nature, there is a propensity to communicate our opinions, our emotions, and every thing that affects us, which may be called the *Language of our Passions*. But fortune and injustice affect us greatly; and of these we are so prone to complain, that, if we have no friend nor acquaintance to take part in our sufferings, we sometimes utter our complaints aloud, even where there is none to listen.

But this propensity operates not in every state of mind. A man immoderately grieved seeks to afflict himself, rejecting all consolation: immoderate grief accordingly is mute; complaining is struggling for consolation:

It is the wretch's comfort still to have
Some small reserve of near and inward woe,
Some unsuspected hoard of inward grief,
Which they unseen may wail, and weep, and mourn,
And glutton-like alone devour.

MOURNING BRIDE, act 1. sc. 1.

When grief subsides, it then, and no sooner, finds a tongue: we complain, because complaining is an effort to disburden the mind of its distress. This observation is finely illustrated by a story which Herodotus records. Cambyses, when he conquered Egypt, made Psammeticus the king prisoner; and, for trying his constancy, ordered his daughter to be dressed in the habit of a slave, and to be employed in bringing water from the river; his son also was led to execution with a halter about his neck. The Egyptions vented their sorrow in tears and lamentations: Psammeticus only, with a downcast eye, remained silent. Afterward meeting one of his companions, a man advanced in years, who, being plundered of all, was begging alms, he wept bitterly, calling him by name. Cambyses, struck with wonder, demanded an answer to the following question: "Psammeticus, thy master Cambyses is desirous to know, why, after thou hadst seen thy daughter so ignominiously treated, and thy son led to execution, without exclaiming or weeping, thou shouldst be so highly concerned for a poor man, no way related to thee?" Psammeticus returned the following answer: "Son of Cyrus, the calamities of my family are too great to leave me the power of weeping; but the misfortunes of a companion, reduced in his old age to want of bread, is a fit subject for lamentation."

Surprise and terror are silent passions, for a different reason: they agitate the mind so violently, as for a time to suspend the exercise of its faculties, and among others the faculty of speech.

Love and revenge, when immoderate, are not more loquacious than immoderate grief. But, when these passions become moderate, they set the tongue free, and, like moderate grief, become loquacious. Moderate love, when unsuccessful, is vented in complaints; when successful, is full of joy expressed by words and gestures.

As no passion hath any long uninterrupted existence, nor beats always an equal pulse, the language suggested by passion is not only unequal, but frequently interrupted: and, even during an uninterrupted fit of passion, we only express in words the more capital sentiments. In familiar conversation, one who vents every single thought, is justly branded with the character of *loquacity*; because sensible people express no thoughts but what make some figure: in

the ſame manner, we are only diſpoſed to expreſs the ſtrongeſt impulſes of paſſion, eſpecially when it returns with impetuoſity after interruption.

It has been obſerved that the ſentiments ought to be tuned to the paſſion, and the language to both. Elevated ſentiments ought to be clothed in words that are ſoft and flowing: when the mind is depreſſed with any paſſion, the ſentiments muſt be expreſſed in words that are humble, not low. Words being intimately connected with the ideas they repreſent, the greateſt harmony is required between them: to expreſs an humble ſentiment in high-ſounding words, is diſagreeable by a diſcordant mixture of feelings; and the diſcord is not leſs when elevated ſentiments are dreſſed in low words. This, however, excludes not figurative expreſſion, which, within moderate bounds, communicates to the ſentiment an agreeable elevation. Figurative expreſſion, being the work of an enlivened imagination, cannot be the language of anguiſh or diſtreſs. Otway, ſenſible of this, has painted a ſcene of diſtreſs in colours finely adapted to the ſubject: there is ſcarcely a figure in it, except a ſhort and natural ſimile with which the ſpeech is introduced: Belvidera, talking to her father of her huſband:

Think you ſaw what paſt at our laſt parting;
Think you beheld him like a raging lion,
Pacing the earth, and tearing up his ſteps,
Fate in his eyes, and roaring with the pain
Of burning fury; think you ſaw his one hand
Fix'd on my throat, while the extended other
Graſp'd a keen threat'ning dagger: oh, 'twas thus
We laſt embrac'd, when, trembling with revenge,
He dragg'd me to the ground, and at my boſom
Preſented horrid death; cry'd out, My friends!
Where are my friends? ſwore, wept, rag'd, threaten'd, lov'd;
For he yet lov'd, and that dear love preſerv'd me
To this laſt trial of a father's pity.
I fear not death, but cannot bear a thought
That that dear hand ſhould do th' unfriendly office.
If I was ever then your care, now hear me;
Fly to the ſenate, ſave the promis'd lives
Of his dear friends, ere mine be made the ſacrifice.

VENICE PRESERV'D, act 5.

To preſerve the foreſaid reſemblance between words and their meaning, the ſentiments of active and hurrying paſſions ought to be dreſſed in words where ſyllables prevail that are pronounced ſhort or faſt; for theſe make an impreſſion of hurry and precipitation. Emotions, on the other hand, that reſt upon their objects, are beſt expreſſed by words where ſyllables prevail that are pronounced long or ſlow. A perſon affected with melancholy, has a languid and ſlow train of perceptions. The expreſſion beſt ſuited to that ſtate of mind, is where words, not only of long, but of many, ſyllables, abound in the compoſition; and for that reaſon, nothing can be finer than the following paſſage:

In thoſe deep ſolitudes, and awful cells,
Where heav'nly-penſive Contemplation dwells,
And ever-muſing Melancholy reigns. POPE.

To

To preserve the same resemblance, another circumstance is requisite, that the language, like the emotion, be rough or smooth, broken or uniform. Calm and sweet emotions are best expressed by words that glide softly: surprise, fear, and other turbulent passions, require an expression both rough and broken.

It cannot have escaped any diligent inquirer into nature, that, in the hurry of passion, one generally expresses that thing first which is most at heart; which is beautifully done in the following passage:

> Me, me; adsum qui feci: in me convertite ferrum,
> O Rutuli, mea fraus omnis. ÆNEID, ix. 427.

Passion has often the effect of redoubling words, the better to make them express the strong conception of the mind. This is finely imitated in the following examples:

> ———————— Thou sun, said I, fair light!
> And thou enlighten'd earth, so fresh and gay!
> Ye hills and dales, ye rivers, woods, and plains!
> And ye that live, and move, fair creatures! tell,
> Tell, if ye saw, how came I thus, how here?—
> PARADISE LOST, b. viii. 273.

> ———————— Both have sinn'd! but thou
> Against God only; I, 'gainst God and thee:
> And to the place of judgment will return;
> There with my cries importune Heav'n, that all
> The sentence, from thy head remov'd, may light
> On me, sole cause to thee of all this woe;
> Me! me! only just object of his ire.
> PARADISE LOST, b. x. 930.

In general, the language of violent passion ought to be broken and interrupted. Soliloquies ought to be so in a peculiar manner: language is intended by nature for society; and a man when alone, though he always clothes his thoughts in words, seldom gives his words utterance, unless when prompted by some strong emotion; and even then by starts and intervals only. Shakespeare's soliloquies may be justly established as a model; for it is not easy to conceive any more perfect:

"FORD. Hum! ha! is this a vision? is this a dream? do I sleep? Mr. Ford, awake; awake, Mr. Ford; there's a hole made in your best coat, Mr. Ford! this 'tis to be married! this 'tis to have linen and buck-baskets. Well, I will proclaim myself what I am; I will now take the leacher; he is at my house; he cannot 'scape me; 'tis impossible he should; he cannot creep into a halfpenny purse, nor into a pepper-box. But, lest the devil that guides him should aid him, I will search impossible places; tho' what I am I cannot avoid, yet to be what I would not shall not make me tame."

MERRY WIVES OF WINDSOR, act 3. sc. last.

Soliloquies upon lively or interesting subjects, but without any turbulence of passion, may be carried on in a continued chain of thought. If, for example, the nature and sprightliness of the subject prompt a man to speak his thoughts in the form of a dialogue, the expression must be carried on without break or interruption, as in a dialogue between two persons; which justifies Falstaff's soliloquy upon honour:—"What need I be so forward with Death, that calls

calls not on me? Well, 'tis no matter, Honours pricks me on. But how if Honour prick me off, when I come on?. how then? Can honour set a leg? No. Or an arm? No. Or take away the grief of a wound? No. Honour hath no skill in surgery then? No. What is Honour? A word.--What is that word *honour?* Air; a trim reckoning.—Who hath it? He that dy'd a Wednesday. Doth he feel it? No. Doth he hear it? No. It is insensible then? Yea, to the dead. But will it not live with the living? No. Why? Detraction will not suffer it. Therefore I'll none of it; honour is a mere scutcheon: and so ends my catechism."

FIRST PART, HERYY IV. act. 5. sc. 2.

LITERARY ANECDOTES.—By Dr. WARTON.

ESSAY ON CRITICISM.

THE first piece of Criticism in our language, worthy our attention, was Sir Philip Sydney's "Defence of Poesie." Spenser is said to have written a critical discourse, called "The Poet;" the loss of which, considering the exquisite taste and extensive learning of Spenser, is much to be regretted. Next came Daniel's Apology; then Ben Jonson's Discoveries, the Preface to Gondibert, Hobbes' Letter to D'Avenant, the Preface and Notes of Cowley (whose prose style, by the way, is admirable), Temple's Essays, Dryden's Essay on Dramatic Poetry, and his various Prefaces and Prologues, Rymer's Preface to Rapin, and Letter on Tragedy, Dennis' Reformation on Poetry, and the Essays of Roscommon and Buckingham. These (says Dr. Warton) were the critical pieces that preceded Pope's Essay on Criticism, which was published without his name, May 1711, and (as Lewis the bookseller told me) did not sell at first, till the author sent copies, as presents, to several eminent persons.

It is not improper to observe what great improvements the art of criticism has received since this Essay was written. Without recurring to pieces of earlier date, and nearer the time in which it was written, we have the Essays in the Spectator and Guardian, Shaftesbury's Advice to an Author, Spence on the Odyssey, Fenton on Waller, and Blackwell's Enquiry into the Life and Writings of Homer. Even of late years, we have had the Treatises of Harris, Hurd's Remarks on Horace, Observations on the Fairy Queen, Webb on Poetry and Music, Brown's Dissertation on the same, the Dissertations of Beattie, Lord Kaim's Elements of Criticism, Blair's Lectures; the Critical Papers in the Rambler, Adventurer, World, and Connoisseur; Johnson's Lives of the Poets; the Biographia Britannica; the Poetics of Aristotle, translated, and accompanied by judicious notes by Twining and Pye; the translations, with notes, of Horace's Art of Poetry, by Hurd and Colman; and the Epistles of Hayley.

ELEGY TO THE MEMORY OF AN UNFORTUNATE LADY.

The true cause of the excellence of this Elegy is, that the occasion of it was real; so true is the maxim, that nature is more powerful than fancy; that we can always feel more than we can imagine; and that the most artful fiction must give way to truth: for this lady was beloved by Pope. After many and wide enquiries, I have been informed that her name was Wainsbury; and that (which is a singular circumstance) she was ill-shaped and deformed as our author.

Her

Her death was not by a sword, but, what would less bear to be told poetically, she hanged herself. Johnson has too severely censured this Elegy, when he says, "that it has drawn much attention by the illaudable singularity of treating suicide with respect; and, that "poetry has not been often worse employed, than in dignifying the amorous fury of a raving girl." She seems to have been driven to this desperate act by the violence and cruelty of her uncle and guardian, who forced her to a convent abroad; and to which circumstance Pope alludes in one of his Letters.

PROLOGUES OF DRYDEN AND POPE.

Pope's Prologue to Addison's Cato is superior to any Prologue of Dryden; who, notwithstanding, is so justly celebrated for this species of writing. The prologues of Dryden are satirical and facetious: this of Pope is solemn and sublime, as the subject required. Those of Dryden contain general topics of criticism and wit, and may precede any play whatsoever, even tragedy or comedy. This of Pope is particular, and appropriated to the tragedy alone, which it was designed to introduce.

ROWE.

The genius of Rowe was rather delicate and soft, than strong and pathetic. His compositions sooth us with a tranquil and tender sort of complacency, rather than cleave the heart with pangs of commiseration. His distresses are entirely founded on the passion of love. His diction is extremely elegant and chaste, and his versification highly melodious. His plays are declamations rather than dialogues; and his characters are general, and undistinguished from each other. Such a furious character as that of Bajazet is easily drawn, and, let me add, easily acted.—There is a want of unity in the fable of Tamerlane. The death's head, dead body, and stage hung in mourning, in the Fair Penitent, are artificial and mechanical methods of affecting an audience. In a word, his plays are musical and pleasing poems; but inactive and unmoving tragedies. That of Jane Shore is, I think, the most interesting and affecting of any he has given us; but probability is sadly violated in it by the neglect of the unity of time. For a person to be supposed to be starved during the representation of five acts is a striking instance of the absurdity of this violation. * * * * * Rowe has taken the fable of his Fair Penitent, from the Fatal Dowry of Massinger and Field. His very spirited translation of Lucan, is perhaps his best work, and one of the best translations in our language, of the only classic, said Addison, not explained for the use of the dauphin.

FENTON.

Of Pope's Epitaph on Fenton, it is observed by Dr. Warton, that his integrity, learning, and genius, deserved the character therein given, and that it was not in any respect overwrought. "His Poems," he adds are not sufficiently read and admired. The Epistle to Southerne, the Ode to the Sun, the Fair Nun, and, above all, the Ode to Lord Gower, are excellent. Akenside frequently said to me, that he thought this Ode the best in our language, next to Alexander's Feast. "I envy Fenton," said Pope to Mr. Walter Hart, "his Horation Epistle to Lambard." Parts of Mariamne are beautiful, and it ought to take its turn on the stage.

Newton.

Newton was born on the very day which Galileo died. When Ramſay was one day complimenting him on his diſcoveries in philoſophy, he anſwered, as I read it in Spence's Anecdotes, "Alas! I am only like a child, picking up pebbles on the ſhore of the great ocean of truth."

It is related in Mr. Harris' MSS. that Newton, hearing Handel play upon the harpſichord, could find nothing worthy of remark but the elaſticity of his fingers. At another time, having aſſerted that Terence's plays had no plot, and Bentley (in this knowledge his ſuperior beyond all controverſy) having copiouſly endeavoured to ſhew the contrary, he concluded as he began, that, Terence's plays had no plot. At another time, being aſked his opinion of poetry, he quoted a ſentiment of Barrow, that it was ingenious nonſenſe.

Thus muſt it neceſſarily happen, when men, even the greateſt, are (according to the common ſaying) got out of their element. No genius, perhaps ever exiſting, was more acute than his in diſcovering true from falſe, in the ſubjects of colour, quantity, and motion. No one had an abler intellect to diſcern what exiſted from that which exiſted not. But, among the number of things exiſting, what were fair, beautiful, graceful, elegant, and what the contrary; of this, by theſe ſtories, one would imagine he had no conception.

Singularities of Great Men.

Dr. Warton produces many curious inſtances to illuſtrate the following line:

> Unthought-of frailties cheat us in the wiſe.

Who could have thought, he obſerves, that Xenophon, during his famous retreat, performed many acts of the moſt vulgar ſuperſtition; that Auguſtus was alarmed and diſpirited if he put on a ſlipper on his right leg which ſhould have been on his left; that Newton once ſtudied aſtrology; that Thuanus, Dryden, and the Chancellor Shafteſbury, calculated nativities; that Roger Aſcham and Dr. Whitby were devoted lovers of cock-fighting, as was Bayle of mountebanks; that Biſhop Hoadly was often rallied by Dr. Clarke for his dread of thunder; that Henry IV. of France, was terrified at the jolting of his coach; that Ben Johnſon and Addiſon were hard drinkers, and Pope himſelf an epicure? The night before the battle of Blenheim, after a council of war had been held in the Duke of Marlborough's tent, at which Louis of Baden and Prince Eugene had aſſiſted, the latter, after the council had broke up, ſtept back to the tent to communicate ſomething he had forgot to the duke, whom he found giving orders to his aid-de-camp Colonel Selwyn (who related this fact) at the table, on which there was now only a ſingle taper burning, all the others being extinguiſhed the moment the council was over. "What a man is this," ſaid Prince Eugene, "who at ſuch a time can think of ſaving the ends of candles?" Elizabeth was a coquette, and Bacon received a bribe. Dr. Buſby had a violent paſſion for the ſtage: it was excited in him by the applauſe he received in acting the Royal Slave before the king at Chriſtchurch; and he declared, that, if the rebellion had not broke out, he had certainly engaged himſelf as an actor. Luther was ſo immoderately paſſionate, that he ſometimes boxed Melanchton's ears; and Melanchton himſelf was a believer in judicial

aſtrology,

aſtrology, and an interpreter of dreams. Mazarin and Richlieu were ſo ſuperſtitious as to employ and penſion Morin, a pretender to aſtrology, who caſt the nativities of theſe two able politicians. Nor was Tacitus himſelf, who generally appears ſuperior to ſuperſtition, untainted by this folly, as may appear from the twenty-ſecond chapter of the ſixth book of his Annals. Men of great genius have been ſometimes compared to the pillar of fire that conducted the Iſraelites, which frequently turned a cloudy ſide toward the ſpectator.

GRAVITY.

The reader may compare a ſenſible reflection of Rochefoucault's with one of the great Confucius on the ſame ſubject: "Gravity," ſays the former, "is a myſterious carriage of the body, to cover the defects of the mind."—"Gravity," ſays the latter, "is only the rind or bark of wiſdom; but it preſerves it."

DR. SAMUEL CLARKE.

Ev'n in an ornament its place remark,
Nor in an hermitage ſet Dr. Clarke.

Pope himſelf thus ſarcaſtically explains this couplet: "Dr. Clarke's buſto placed by the queen in the Hermitage, while the doctor daily frequented the court."—"But he ſhould have added," ſays his more candid annotator Warburton, "that he frequented the court—*with the innocence and diſintereſtedneſs of a hermit.*"

"Theſe lines," obſerves Dr. Warburton, "are as ill-placed and injudicious as the buſto they were deſigned to cenſure. Pope imbibed an averſion to this excellent man. Bolingbroke hated Clarke, not only becauſe he had written a book which this declamatory philoſopher could not refute, but becauſe he was a favourite of Queen Caroline."

ARBUTHNOT.

Arbuthnot was a man of conſummate probity, integrity, and ſweetneſs of temper; he had infinitely more learning than Pope or Swift, and as much wit and humour as either of them. He was an excellent mathematician and phyſician, of which his Letter on the Uſefulneſs of Mathematical Learning, and his Treatiſe on Air and Aliment, are ſufficient proofs. His tables of ancient coins, weights, and meaſures, are the work of a man intimately acquainted with ancient hiſtory and literature, and are enlivened with many curious and intereſting particulars of the manners and ways of living of the ancients. The Hiſtory of John Bull, the beſt part of the Memoirs of Scriblerus, the Art of Political Lying, the Freeholder's Catechiſm, It cannot Rain but it Pours, &c. abound in ſtrokes of the moſt exquiſite humour. It is known he gave numberleſs hints to Swift, and Pope, and Gay, of ſome of the moſt ſtriking parts of their works. He was ſo neglectful of his writings, that his children tore his manuſcripts, and made paper kites of them. Few letters in the Engliſh language are ſo intereſting, and contain ſo much of Chriſtian reſignation and calmneſs of mind, as one that he wrote to Swift a little before his death. He frequently, and ably, and warmly, in many converſations, defended the cauſe of revelation againſt the attacks of Bolingbroke and Cheſterfield.

Dr. Bentley.

Swift imbibed from Sir William Temple, and Pope from Swift, an inveterate and unreaſonable averſion and contempt for Bentley, whoſe admirable Boyle's Lectures, Remarks upon Collins's Emendations of Menander and Callimachus, and Tully's Tuſculan Diſputations; whoſe edition of Horace, and, above all, Diſſertations on the Epiſtles of Phalaris (in which he gained the moſt complete victory over a whole army of wits), all of them exhibit the moſt ſtriking marks of accurate and extenſive erudition, and a vigorous and acute underſtanding. He degraded himſelf much by his ſtrange and abſurd hypotheſis of the faults which Milton's amanuenſis introduced into the Paradiſe Loſt. But I have been informed there was ſtill an additional cauſe for Pope's reſentment:—That Atterbury, being in company with Bentley and Pope, inſiſted upon knowing the doctor's opinion of the Engliſh Homer; and that, being earneſtly preſſed to declare his ſentiments freely, he ſaid, "The verſes are good verſes, but the work is not Homer, it is Spondanus." It may, however, be obſerved, in favour of Pope, that Dr. Clarke, whoſe critical exactneſs is well-known, has not been able to point out above three or four miſtakes in the ſenſe throughout the whole Iliad. The faults of that tranſlation are of another kind: They are ſuch as remind us of Nero's gilding a brazen ſtatue of Alexander the Great, caſt by Lyſippus.

Gay.

The ſweetneſs and ſimplicity of Gay's temper and manners much endeared him to all his acquaintance, and made them always ſpeak of him with particular fondneſs and attachment. He wrote with neatneſs and terſeneſs; *æquali quadam mediocritate*, but certainly without any elevation; frequently without any ſpirit. Trivia appears to be the beſt of his poems, in which are many ſtrokes of genuine humour and pictures of London life, which are now become curious, becauſe our manners, as well as dreſſes, are ſo much altered and changed within a few years. His Fables, the moſt popular of all his works, have the fault of many modern fable-writers—the aſcribing to the different animals and objects introduced, ſpeeches and actions inconſiſtent with their ſeveral natures. An elephant can have nothing to do in a bookſeller's ſhop. They are greatly inferior to the Fables of La Fontaine, which is, perhaps, the moſt unrivalled work in the whole French language. The Beggar's Opera has ſurely been extolled beyond its merits. I could never perceive that fine vein of concealed ſatire ſuppoſed to run through it: and, though I ſhould not join with a bench of Weſtminſter juſtices in forbidding it to be repreſented on the ſtage, yet I think pickpockets, ſtrumpets, and highwaymen, may be hardened in their vices by this piece; and that Pope and Swift talked too highly of its moral good effects. One undeſigned and accidental miſchief attended its ſucceſs: it was the parent of that moſt monſtrous of all dramatic abſurdities, the Comic Opera. The friendſhip of two ſuch excellent perſonages as the Duke and Ducheſs of Queenſberry, did, in truth, compenſate poor Gay's want of penſion and preferment. They behaved to him conſtantly with ſuch delicacy and ſenſe of ſeeming equality, as never to ſuffer him for a moment to feel his ſtate of dependence. Let every man of letters, who wiſhes for patronage, read D'Alembert's Eſſay on living with the Great, before he enters the houſe of a patron; and let him always

always remember the fate of Racine, who having drawn up, at Madame Maintenon's fecret requeft, a memorial that ftrongly painted the diftreffes of the French nation, the weight of their taxes, and the expences of the court, fhe could not refift the importunity of Louis XIV. but fhewed him her friend's paper; againft whom the king immediately conceived a violent indignation, becaufe a poet fhould dare to bufy himfelf with politics. Racine had the weaknefs to take this anger fo much to heart, that it brought on a flow fever, which haftened his death. The Duchefs of Queenfberry would not fo have betrayed her poetical friend Gay.

Celebrated deformed Men.

Hay, in his Effay on Deformity, has remarked that Pope was fo hurt by the caricatura of his figure, as to rank it among the moft atrocious injuries he received from his enemies. Hay, with much pleafantry, jefting on his own deformity, has added, "In perfon I refemble Æfop, the Prince of Orange, Marfhal Luxemburg, Lord-treafurer Salifbury, Scarron, and Mr. Pope; not to mention Therfites, and Richard III. whom I do not claim as members of our fociety; the firft being a child of the poet's fancy; the laft, mifreprefented by hiftorians. Let me not be unthankful that I was not born in Sparta! where I had no fooner feen the light but I fhould have been deprived of it, and have been thrown, as a ufelefs thing, in a cavern by Mount Taygetus."

Blackmore, Locke, and Galileo.

All the wits feem to have leagued againft Sir Richard Blackmore. In vain was he extolled by Molyneux and Locke: but Locke, to his other fuperior talents, did not add good tafte. He affected to defpife poetry, and he depreciated the ancients: which circumftance, as I was informed by the late Mr. James Harris, his relation, was the fource of perpetual difcontent and difpute between him and his pupil Lord Shaftefbury; who, in many parts of his Characteriftics, and Letters to a Clergyman, has ridiculed Locke's felfifh philofophy, and reprefented him as a difciple of Hobbes; from which writer it muft in truth be confeffed that Locke borrowed frequently and largely. Locke had not the fine tafte of a greater philofopher; I mean Galileo, who wrote a comment on Ariofto full of juft criticifm.

Erasmus and Luther.

The violence and haughtinefs of Luther difgufted the mild and moderate Erafmus, and alienated him from purfuing the plan of reformation, which at firft he feemed to encourage and engage in. Luther reprefented him as an Arian and a time-ferver. "I thought," faid Erafmus, "that Luther's marriage would have foftened him a little. It is hard for a man of my moderation, and of my years, to be obliged to write againft a favage beaft and a furious wild boar." But great revolutions and great reformations are not effected by calm and fober reafon, nor without fuch violence and enthufiafm as Luther poffeffed. When Voltaire was lamenting that Locke and Newton had few difciples in comparifon of the numerous followers of Luther and Calvin, it was replied to him, "that, without a Luther and Calvin, we fhould never have had a Locke or Newton."

English Peers.

It having been difputed between two eminent perfons, whether Swift or Pope had in their writings faid the fevereft things on Englifh peers, it was judged to be Swift, in the following paffage of Gulliver:

liver: "The King of Brobdignag asked me what methods were used to cultivate the minds and bodies of our young nobility; and in what kind of business they commonly spent the first and teachable part of their lives? what course was taken to supply that assembly when any noble family became extinct? what qualifications were necessary in those that were to be *created new lords*; whether the humour of the prince, a sum of money to a court lady or a prime minister, or a design of strengthening a party opposite to the public interest, ever happened to be motives to those advancements? what share of knowledge these lords had in the laws of their country, and how they came by it, so as to enable them to decide on the properties of the following subjects in the last resort? whether they were always so free from avarice, partialities, or want, that a bribe, or some other sinister view, could have no place among them?" This is very caustic and severe; but is exceeded by what has lately been said by the late Mr. Burke, of the Duke of Bedford, "being swaddled, rocked, and dandled into a legislator."

Augustus Cæsar.

A noted French writer calls Augustus, "Un fourbe, un assassin, nommé Octave, parvenu à l'empire par des crimes qui meritaient le dernier supplice.—One Octavius, an impostor, an assassin, who obtained the empire by crimes for which he ought to have been condemned to death."

General Oglethorpe.

One driv'n by strong benevolence of soul,
Shall fly, like Oglethorpe, from pole to pole.

Here are lines that will justly confer immortality on a man, who well deserved so magnificent an eulogium. He was at once a great hero and a great legislator. The vigour of his mind and body have been seldom equalled. The vivacity of his genius continued to a very old age. The variety of his adventures, and the different scenes in which he had been engaged, make one regret that his life has never been written. Dr. Johnson once offered to do it, if the general would have furnished the materials. Johnson had a great regard for him; for he was one of the first persons that highly, in all companies, praised his "London." His first campaign was made under Prince Eugene, against the Turks; and this great general always spoke of Oglethorpe in the highest terms. Neither he nor Eugene loved Marlborough. He once told me, (for I had the pleasure of knowing him very well,) that Eugene, speaking of Marlborough, said, "There is a great difference between making war *en maitre* or *en avocat*." But his settlement of the colony of Georgia gives more lustre to his character than even his military exploits.

Arthur Onslow.

By an affected gravity, and a solemn and important air, this gentleman presided for many years over the house of commons; but not with the ability, knowledge, patience, prudence, and amiable manners, of the present speaker, Mr. Henry Addington. It is a curious fact in the history of English liberty, that the very first person who was raised by the commons to the dignity of their speaker was a member who had been imprisoned by King Edward III. for attacking his ministers and his mistress in parliament.

DESCRIPTION

DESCRIPTION OF DOVER CASTLE.

THIS fortreſs has been famous through many ages, and was formerly eſteemed the lock and key of the whole kingdom ; it is very extenſive, upwards of thirty-five acres are ſuppoſed to be contained within the walls. As it is frequently aſſerted in our old chronicles, and from them tranſcribed into our local and more general hiſtories, that Dover caſtle was built by Julius Cæſar, many who have viſited it have been ſatisfied with this idle report ; but the works ſtill remaining bear evident marks of its having been raiſed in different and very diſtant periods of our hiſtory. The three leading characteriſtical parts of ground-plans and buildings are Roman, Saxon, and Norman ; but when, or by whom, each part was raiſed, and for what particular purpoſe, remains to be determined by attending to the maſonry and the different methods of fortification, and conſidering when they were probably introduced into our iſland. The Roman fortifications, or all the works we can now trace of that enterpriſing and warlike people, upon the hill, are bounded by the deep ditch which encloſes that ſpace in which the church and octagonal watch-tower are placed; and it will be a vain attempt to ſearch after any Roman military work in the caſtle beyond it. The form of the camp, the ditch, and the octagonal building, all point out the hand of the Roman engineer and the Roman architect. It was no uncommon thing for them, where the ground would admit of it, to make their camp in the form of a parallelogram, with the angles rounded off, and to ſecure it with a deep ditch and a high parapet. This appears to be the original plan of the Roman camp on this hill, before it was altered either by the Saxons or the Normans. The hiſtorians, who have aſcribed this work to Julius Cæſar, did not attend to the place of his landing, the time he was here, nor the difficulties he had to encounter to fill up his time, without employing himſelf in building caſtles and towers. The fortifications about the caſtle underwent ſeveral material alterations in the year 1796. Of the new works, the moſt uſeful part is a battery of thirty-two-pounders, on a level with the water's edge. From this battery, if neceſſary, the men can retreat into the caſtle, aſcending by a perpendicular ſhaft which has been made through the ſolid rock.

The firſt expedition of the Romans to Britain, under Julius Cæſar, was in the year fifty-five before Chriſt ; and it has been determined to have been about the latter end of Auguſt when he arrived with his fleet in the valley where the town of Dover is now built ; the ſea then flowing in between two high hills, ſituated in the entrance of the bay, forming naturally a fine harbour for his ſhips, well ſheltered from the winds, and the valley afforded plenty of wood, and fine water. But the emperor was obliged to relinquiſh this deſirable ſituation, as the Britons, from the high and bold ſhores, could ſo eaſily annoy his men with their miſſive weapons. As Julius Cæſar was too prudent and cautious to attempt the landing of his men under ſuch great diſadvantage and danger, he weighed anchor with the flood-tide, which was in his favour, about three o'clock in the afternoon, on the 23d of Auguſt, and he ſailed about eight miles farther towards the north ; and, if we allow for the ſetting of the current at the rate of five miles an hour, he was carried farther than he

he estimated, and landed in the bay and near the high ground where Richborough castle was afterwards built.

To determine whether he built a castle on the hill at Dover during this expedition, we have only to attend to the reception he met with from the natives on-shore; the damage he sustained in his fleet by a storm; the time he was confined in his camp, and the injury he sustained in his retreat; the conclusion must be, that he could not march so far from his ships in an enemy's country to build a tower.

As the same emperor made a second descent upon Britain the following year, and, according to several of our historians, very probably at the same place, it is next to be considered, whether he was not fully employed, during the months he continued here, without fortifying any other place than the ground he encamped upon.

If he waited only two days on the coast at his arrival for that part of his fleet he left behind him, and spent ten days more in refitting his ships, which had suffered severely by tempestuous weather, he could not have had above three weeks to fight his battles; to ravage the country; to form alliances and conclude treaties with different and very distant states; and, if he only did one quarter part of what some of our historians have mentioned, he never had any time to erect a single tower at Dover. As this was the last expedition of the Romans to Britain till the year of Christ forty-three, it will be in vain to look for any Roman building at this spot till the reign of Claudius Cæsar.

Whether this emperor was excited by an ambitious desire of a triumph, or any injury he had received from the Britons, he determined, in the third year of his reign, to attempt the conquest of our island; and sent over Aulus Plautius, a general of consular dignity, with an army, and was successful in his first attempt upon the natives. If we can depend upon the credit of a Roman historian, he reduced part of Britain into the form of a Roman province, and placed a colony of veterans to secure it.

As the attempt was prosperous, it encouraged Claudius Cæsar to send over Publius Ostorius Scapula, another general of rank, in the year of Christ forty-nine; and he, finding the natives inclining to insurrection, immediately determined to disarm such as he suspected, and to build forts or castles to awe the rest.

There are several reasons why they fixed on the hill at Dover for a camp on their first settling on our island. The garrison could not only defend the small works they cast up here against a superior force, but it could command the harbour for receiving a reinforcement from the continent, or securing a retreat to it, if necessary, by the assistance of their ships; we are therefore led to conclude that Aulus Plautius fixed his colony of veterans here before forts were built in the interior parts of the country; besides, it is the nearest part of Britain to the opposite shore. If we admit this conjecture, as we have but slight hints in history upon this subject, we may date the beginning of Dover castle, or so much of the ground-plan as appears to be Roman work, between the years of Christ forty-three and forty-nine.

As the Romans seemed now determined upon the conquest of Britain, and were obliged frequently to cross and recross the sea, it was necessary, that their passage to and from the continent might be safe for their ships, to erect a light-house upon the high lands on each

each ſide the Channel. The advantages of having ſuch a guide to a ſafe harbour, protected by their friends, were too great to be overlooked by the Romans, for without it they would have been expoſed to frequent ſhipwrecks by coming upon the coaſt in the dark, and liable to the attacks of the natives whoſe haunts they were at firſt unacquainted with.

By theſe reaſons we may conclude the octagonal building at the weſt end of the church was originally deſigned for a Roman lighthouſe and watch-tower, and erected either by Aulus Plautius or Publius Oſtorius Scapula. The foundation of this building is in a bed of clay, a method which was uſually practiſed by the Roman maſons, and this is ſaid to be one of the criterions of a Roman work; but the materials and the maſonry of this tower both declare it of very high antiquity. The tiles are of the uſual thickneſs of Roman tiles, but of different dimenſions, and ſome of them appear to have been caſt in a mould peculiar to the makers of them at this place. The tiles in the courſe, which is now nearly level with the ſurface of the ground, on the eaſtern aſpect of the building, are on one ſide full of winding grooves, with four hemiſpherical knobs nearly equidiſtant from each angle, intended probably to make the mortar adhere more firmly. But what is moſt ſingular in the form of the tiles is their having a projection at the narrower end on each ſide of about one inch and three quarters, and an inch and an half wide, with a ſpace left of the ſame dimenſions at each angle of the oppoſite end, that, by reverſing the tiles when laid in the wall, the projecting part might drop into that ſpace like a half dove-tail, which rendered it impoſſible for them to ſlip from each other. The ground has been raiſed ſeveral feet ſince the firſt building of this tower; the form of it is octagonal without but a ſquare within, and the ſides of the ſquare and of the octagon are each about fourteen feet. The thickneſs of the walls to the marks of the firſt floor is about ten feet. In four of the ſides of this building are openings in the walls about four feet wide, and three of them of nearly equal heights, or about thirteen feet ſix inches within ſide, with ſemi-circular arches turned with Roman tiles, and either a ſtalactical concretion or a compoſition made and uſed by the Romans inſtead of ſtone. The pieces of this natural or factitious production applied in turning the arches are wedge-ſhaped, about four times the thickneſs of the tiles, and placed alternately between them with a thin laying of mortar of a reddiſh colour.

Though it is difficult to ſay whether this tower was uſed as a place of defence by the Romans, there can be little doubt of its having been applied to that purpoſe by the Normans. The maſonry on each ſide the openings within the building is very different from the original work; and the ſpaces left in the wall for what we now call the windows, are much wider at the bottom than the old arch on the top. If they were intended at firſt only to give light, they were afterwards converted to loop-holes which were left almoſt cloſe under the arch, and there were ſteps from the bottom to aſcend to them, as appears by the preſent ſlopings in the wall; and this alteration was probably made upon Gundulph's plan of defence, ſoon after the Normans undertook to fortify Dover caſtle. The arch over the original entrance on the eaſt ſide is about ſix feet wide, and ſtill perfect. The other arches, which are damaged, have ſuffered more from violence, and an idle curioſity in breaking off pieces of the

materials to try their hardness, than either by age or the effects of the weather. It is very singular that the walls of the tower were originally built with the same kind of natural or artificial production the masons used in turning the arches, and they cut or formed it into blocks about seven inches deep and a foot in length; but the pieces vary in their dimensions. The work was carried up with first seven courses of these blocks, and then two courses of tiles; and this method was continued to the top of the tower. Many of these blocks differ in their solidity, neither are they all composed of the same proportionable parts of other bodies; they very much resemble the sediment found at the bottom of petrifying streams, both in their appearance and their properties; and a gentleman very conversant in the fossile world does not hesitate to call them a stalactical concretion. Several of the outside courses, which are still remaining on the east side of the building, seem hardened by being exposed to the weather.

As stalactical concretions abound in limestone-countries, and are so light as well as durable, they were very proper materials for the Romans to transport in their small vessels to places where they could not find stone for erecting towers of strength. This appears a convincing proof of the antiquity of this building, and that it was raised by the Romans upon their settling in Britain; for, if they had waited till they had been better acquainted with the country, they would have found stone much nearer the place.

This tower has been cased over, and very probably in the reign of Henry V. Erpingham being then lord warden of the castle, whose arms (two bars and a canton) are placed on a stone on the north side of it. As the casing is now dropping off in many places, and the old work is again exposed to the weather, time, which has been for so many ages eating into this work, must by degrees crumble it to rubbish, since there is but little probability of seeing it repaired again by those who preside over such works. The last use made of this tower was to contain a ring of bells, which Sir George Rooke by his interest removed to Portsmouth; and the board of ordnance soon after, for the sake of a trifling sum, disposed of the lead which covered them, and left, perhaps, one of the most ancient pieces of masonry in this kingdom open to the corroding effects of the sea-air, and to be mouldering away by the violent attacks of every winter storm. The last and only remaining pieces of masonry, within the Roman fortification, are the body and tower of the church; which, though not so old as the adjoining building, still retain, in their present state, striking marks of ancient workmanship.

The learned antiquarians have been very much divided in their opinions concerned the antiquity of this church, and each has contended for his own conceit, without producing any substantial reasons to support it. Our monkish chronicles, and several of our old historians after them, have ascribed the building of this church (which is in the form of a cross), and St. Martin's near the city of Canterbury, to Lucius, whom they suppose to have been a provincial king in Britain by the courtesy of the Romans: he probably reigned in Kent between the years of Christ 131 and 177.

Whether this church was built by King Lucius, or by his order, it will not be worth while to determine on the credit of a monkish chronicle, which is erroneous in many instances; and by drawing hasty conclusions from the masonry we may be led wide of the truth. It is the general and prevailing opinion of those who have visited

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these ruins, that the church was originally built out of the decayed works of the Romans, the Roman tiles being ſeen in almoſt every part of it, and placed, they ſay, without any regularity. But it is very perceptible that the maſonry, in whatever age it was built, was carried on in a very regular plan (a few trifling inſtances excepted) through the whole building.

In all maſonry, ancient and modern, whether Roman, Saxon, Norman, or Engliſh, one general method is purſued by the different artiſts, which is, their carrying up the angles of their buildings with ſquared materials, when they raiſed their walls with flints, or rubbles, or ſuch rough ſtones as they found upon the ſpot. Now it is evident upon a very ſlight inſpection, that the angles of this fabric were all originally formed with tiles, caſt in the Roman manner; which proves the artiſts had no ſtones they could ſquare for that purpoſe near their work: for, when they had, they were never at the trouble of caſting tiles. It is very probable that this church was built by ſome of the firſt maſons who arrived here from the continent, after the Saxon converſion, and in the place of one of plaiſter raiſed by Eadbald, becauſe the monks could here retire in ſafety, and exerciſe the duties of their office without fear of interruption by any ſudden invaſion of the enemy. As it is much to be doubted whether there be any religious fabric in the county which can boaſt a higher antiquity than ſome part of this ruin, we may place the foundation of it between the firſt arrival of the artiſts from the continent (whither they had fled for protection ſoon after the beginning of the war of the Saxons with the natives) and the reign of Alfred, who alſo adopted the plan of building chapels in fortifications.

Three chaplains were formerly allowed to this caſtle, and they were permitted to wear the habits of prebends, on account of the dignity and antiquity of the place. The firſt chaplain ſaid maſs to the governor at the high altar; the ſecond to the marſhalman and his officers, at ten o'clock, at the altar of the Virgin Mary; and the third to the ſoldiers, at nine o'clock, at the north end of the chapel of relics.

After the reformation, when ſuperſtition was driven, by royal authority, from this church, the very appearance of religion ſoon retired from its altars; and it is much to be feared, that the ancient ſalary, which is ſtill continued, has been frequently applied to anſwer political more than religious purpoſes; as the chaplain and the inhabitants of the caſtle are no farther acquinted with each other than by name.

In this church ſeveral perſons of family and note have been interred. In the chapel which contained the grand altar, Weever ſays, "lieth a knight whoſe portraiture is inlaid with braſs upon a marble ſtone, with this inſcription: viz. Hic jacet Robertus Aſheton, myles, quondam conſtabularis caſto Dovorre, et cuſtos Quinque Portum, qui obiit nono die Januar. A. D. milleſimo CCC octogeſimo quarto, cujus animæ propitietur Deus. Amen." The ſtone which contained the effigies of Sir Robert Aſheton, and the foregoing inſcription, is broken into ſeveral pieces, and parts of it are ſtill remaining in the church, but there is not any thing to be ſeen on it, except the grooves which contained the braſs work. The above-mentioned Robert Aſheton, knight, was admiral of the fleet, chief juſtice of Ireland, lord-treaſurer, and one of the executors to the laſt will of Edward III.

He was descended from the Ashetons of Asheton-under-Line, in the county of Lancaster.

On the right hand side of the south chapel there was formerly a marble coffin, which contained the remains of Henry Howard earl of Northampton, and lord-warden of the five ports in the reign of James I. and it was placed upon a marble tomb, which contained the following inscription: viz. Henricus Howardus, Henrici comitis Surriæ filius, Thomas secundi Norfolciæ ducis nepos, et Thomas tertii frater; comes Northamtoniæ, baro Howard de Marnhill; priviti sigilli custos; castri Durovernensis constabularius: Jacobo Magnæ Britanniæ Regi ab intimis conciliis; ordinis periscelidis eques auratus, et academiæ Cantabrigiensis cancellarius; inter nobiles literatissimus, in spem resurgendi in Christo hic conditur. Obiit 15 die Junii, A. D. 1614. Inclytus hic comes tria hospitalia fundavit, et catifundiis dotavit: unam Grenewici in Cantio, in quo viginti Egeni et præfectus: alterum cluni in comitatu Solopiæ, in quo XII Egeni com præfecto: tertium ad Castrum Rising, in comitatu Norfolciæ, in quo XII pauperculæ cum gubernatrice in perpetuum alantur. Johanne Griffiths, huic comiti ab epistolus, curante, positum. Of this nobleman, it was said that he was the most learned among the noble, and the most noble among the learned.

A few years ago there was remaining, in the walls of the chapel, a thick stone, with the following inscription; but this has been wantonly broken, and the remains are buried in the rubbish. Memorandum.—"In this place was buried the body of Henry earl of Northampton, and constable of Dover castle, and lord-warden of the cinque ports, A. D. 1614. And in this place stood likewise a monument of the said earl, whose body and monument, by reason of the ruinous condition of this chapel, was moved, A. D. 1696, to the chapel of the hospital of East Greenwich, in the county of Kent, of the foundation of the said earl, at the charge of the worshipful company of mercers, London, governors of the said hospital; and with the consent of the Archbishop of Canterbury, and of his grace the Duke of Norfolk, and of Henry earl of Romney, lord-warden and constable of Dover castle."

The ground behind the church is the burying-place for the soldiers who die in the castle; and, though there are but few of them who have had even a stone placed at the head of their graves to perpetuate their memory, yet they are now nearly upon a level with those who have had monuments of sculptured marble, and plates of engraved brass, to inform the inquisitive traveller of their birth and rank: for, alas! time, which levels all distinctions, will read us in this church a melancholy lecture on our vanity; and reflection will teach us how small the difference between the commander and the commanded in the mansions of death; when we find there is hardly a trace left here of all the splendour of the rich and great.

But to return to the fortifications: the Saxons made many additions to the Roman works, and extended them towards the land; which after their manner was raised and levelled on the top, and encompassed by a deep broad ditch; and the first tower known to have been built in the exterior walls before the Norman conquest was built by order of Godwin earl of Kent and governor of Dover castle, and probably the Saxon keep was soon afterwards surrounded by walls and towers. The gateway faced the Roman camp, and of the

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towers we will ſpeak in their order. Proceeding from this gate, formerly called palace-gate, (becauſe it immediately led to the palace, now called the keep,) the firſt tower to the right-hand was called the Duke of Suffolk's tower; the others are in the following order: the old arſenal; the king's kitchen, and other offices; King Arthur's hall, on the eaſt ſide of the keep, where a meſs-room and other buildings have been erected for the uſe of the military officers; and in the hall on this ſide the quadrangle are four other towers, excluſive of one on each angle; but their particular names have not reached the preſent time. Next follows the king's gate and bridge; this was formerly ſecured by two ſtrong gates, and a portcullis. On each ſide the gateway there is an acceſs in the wall, open in front, after the manner of ſome of the Saxon fortifications. Theſe receſſes were uſed for various purpoſes: they were deſigned for retreats for their women and children; repoſitories for their arms; and for places whither their officers and men might retire to reſt in ſafety. This gate was ſtrengthened with an out-work, conſtructed in ſuch a manner as to command the vallum on each ſide the bridge; the walls of this work are about ten feet thick at the gateway by the foot of the bridge. Theſe walls are faced with flint, and the ſpace filled up with rubbiſh and mortar, which (we are told) is one of the criterions of Saxon maſonry. The three next towers were called Magminot towers; and the laſt, which is next the palace-gate, was named Arthur's ſmaller hall, or Queen Guaonabour's bed-chamber. Henry VIII. made a magazine of Guaonabour's royal bed-chamber to depoſit his ſtores in, when he went with Anne Boleyne to France; it is not improbable that they were a part of the ſtores which were afterwards ſhewn for the wine, ſalt, and beef, left here by Julius Cæſar. Theſe towers are not to be perceived within the quadrangles, the preſent building having been erected ſo as to cover them on the inſide.

It is impoſſible, in the compaſs of this work, to give a very particular deſcription of all the various contrivances in the palace or keep, a building deſigned by the ingenious architect for ſtrength and defence, for annoying the beſiegers, and for the ſafety of thoſe who were to defend the tower, in caſe of a cloſe ſiege.

Our hiſtorians inform us, upon the authority of a nameleſs chronicle in Norman-French, that Henry II. about the year of Chriſt 1153, the year in which he came from Normandy for the relief of Wallingford caſtle, and immediately preceding his ſucceſſion to the throne, built this keep or palace, and encloſed it with a new wall. There was certainly a wall round this part of the Saxon work previous to that king's reign, as the towers of Magminot were built in the curtain; but, as to the keep in the centre of the quadrangle, it will be difficult to determine, either from hiſtory or the maſonry, when, and whether by William, or Henry I. or by whom, it was firſt founded, as it underwent ſo many repairs in different and diſtant periods of time, and the ancient maſonry is hidden by the modern work. This noble tower is built upon Gundulph's plan, who was biſhop of Rocheſter, and employed by William the Conqueror to draw deſigns for his caſtles. The preſent entrance is on the ſouth ſide of it; and by a grand flight of ſteps you aſcend round the eaſtern ſide to the third ſtory, on which, in Gundulph's caſtles, were the royal, or governor's, apartments. The rooms are large and lofty,

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but they have very little at this time, except ſtrength and ſecurity, to recommend them to our refined taſtes. This grand flight of ſtone ſteps was formerly ſecured by three ſtrong gates. By the firſt veſtibule, on the right hand going up, is a room which was probably deſigned for the perſon who guarded the firſt gate. Oppoſite to this is another, adorned on every ſide with beautiful arches richly embelliſhed with zigzag and other work; this, it is likely, was the chapel. The artiſt has been more laviſh of his ſkill in theſe arches than in thoſe over the door and on the ſide of the wall in the veſtibule. Though they are the true ſemi-circular arch, it is much to be doubted whether they are the work of a Saxon artiſt. Above this room is another, richly ornamented in a ſimilar manner, which probably was a chamber. Beneath the chapel and the firſt veſtibule, was the dungeon for priſoners; ſeveral perſons of diſtinction have been confined here at different times, but it is now only made uſe of as a priſon for ſoldiers when they are under cloſe confinement. There are galleries built in the walls, with loop-holes, to annoy the beſiegers; and they are ſo contrived, that it would have been next to impoſſible for them to hurt the beſieged in any of the rooms by ſhooting at them. The ſecond floor was intended for the uſe of the garriſon, and that on the ground for ſtores. The window on the left hand, when we enter the keep at the door fronting the firſt flight of ſteps, will convince us what care our anceſtors took to prevent an arrow ſhot in at a loop-hole from reaching to the room ſo as to do any execution in it. The wall being eighteen feet thick, it gave them an opportunity of turning a ſloping arch from the top of the aperture in ſuch a manner that the height of the opening in the wall, within the room, might not exceed that of the bottom of the window or loop-hole. This being conſiderably above the ground, their warriors aſcended to it by a flight of ſtone ſteps in the wall; and, as the arch over their heads was turned to anſwer the aſcent or deſcent of the ſteps, an arrow, ſhot in at the aperture with the leaſt elevation, could never paſs the thickneſs of the wall without ſtriking ſome part of the arch. In the north angle of the keep, we are told, there is a well, which is now arched over; and it was this well which Harold, before his advancement to the throne, promiſed, upon his oath, to deliver up with the caſtle to William duke of Normandy. There is ſome difference between the mind of a prince when in poſſeſſion of a crown and at a diſtance from it; he violated his oath, and the violation of it coſt him his life.

Juſt without the Duke of Suffolk's gate are barracks for the ſoldiers, and likewiſe the wells which ſupply the garriſon with water; they are each about three hundred and ſeventy feet deep.

William duke of Normandy, after his ſucceſsful battle near Haſtings, in which Harold king of England was ſlain and his army routed, judged it neceſſary, before he quitted the coaſt, to ſecure a retreat to, and keep open a communication with, Normandy, by the aſſiſtance of his fleet, in caſe he ſhould meet with a repulſe. Dover caſtle was the place fixed upon; and, as it was even then a noted fortification, he marched his army to beſiege it, and it ſurrendered to him after a very feeble reſiſtance. The conqueror knew the weak parts of the caſtle; and, thinking it of too much conſequence to him to ſuffer it to be re-taken by any neglect or ſurpriſe, he appointed Odo biſhop of Bayeux (his brother, whom he created earl of Kent) juſticiary

justiciary of England, regent, and governor of Dover castle, with a strong garrison, to defend it for him against any attack that might be made upon it. This proud, avaricious, and imperious, prelate, falling into disgrace, John Fienes, a trusty Norman, and one the Conqueror could confide in, was appointed governor of the fortification, and he had the lands given him; which he held of the crown, to secure and defend their works. This worthy knight, being willing to prove himself deserving of the favours conferred upon him by his sovereign, proceeded to discharge the important trust with great skill and diligence. It was by his order, and under his inspection, that the two exterior walls were joined to the Saxon fortification, and continued down to the very edge of the high perpendicular cliff. As he did not think himself equal to the task, he selected eight tried and approved Norman warriors to assist him in superintending and expediting the work. The names of these commanders were William de Albranche, Fulbert de Dover, William Arsic, Jeffery Peverel, William Mainsmoth, Robert Porth, Robert or Hugh Crevequer, and Adam Fitzwilliam. These had among them one hundred and twelve knights' fees, and were not only obliged to find a number of soldiers in proportion to the knight's fees they held of the crown, but they were bound by the nature of their tenure to build a tower for the defence of the castle, and for their own particular residences, and to place their arms in the front of it.

The names of the towers in the exterior wall of the castle, beginning at the side of the cliff next the town, are—Cannons, or Monk's Gate, where at present is a battery; Albrancis, or Rokesley's Tower; Chilham, or Chaldescot's Tower; Hurst Tower; Arsic, or Say Tower; Gatton Tower; Peverel, Beauchamp, or Marshal's, Tower; Port, Gastling, or Mary's, Tower; Fienes, or New Gate, or the Constable's Tower; Clopton Tower; Godsfoe Tower; Crevequer, or Cranville, or Earl of Norfolk's, Tower; Fitzwilliam's, or St. John's Tower; Avaranche's, or Mansel's Tower; Veville, or Pincester Tower; Earl Godwin's Tower; and Ashetisfordian Tower.

Of these towers those most worthy notice at present are, first, Chilham, or Chaldescot's Tower, the third from the edge of the cliff. This was built by Fulbert de Lucy, whose family came over with William the Conqueror from Normandy; and, being selected by John Fienes to assist him in defending the castle, he changed his name for Dover. But the tower was named after the manor, and they who held Chilham were obliged to keep it in repair. Chaldescot succeeding to the command here, the tower was called by his name.

In the front of this building is a house for an officer under the lord-warden of the cinque ports, called the Bodar of Dover castle. Though the ancient title is still retained, the original duty of his office is but little known by the inhabitants of the five ports and their ancient towns. The word is derived from the Saxon, *Boda*, which signifies a messenger, or a person sent with letters, injunctions, or precepts, from the superior of any particular jurisdiction. Upon all writs directed to him from the office of the lord-warden, or the constable of Dover castle, he is called My Bodar, or, which is the same thing, My Messenger.

The bodar of Dover castle has also another title annexed to his office, which is sergeant at arms. By this post he has power from the lord-warden to take into his particular jurisdiction crown and other debtors under an arrest, and to shut them up, and keep them

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in safe custody, in a prison belonging to Fulbert de Dover's Tower. In this, as in many other gaols in peculiar districts, there are several alterations necessary, and some things which ought to be rectified without the authority of parliament. It is to be hoped, that, when the state of this prison is known, some person who has the power will have the inclination to endeavour to soften the hardships which many suffer in it. There are but two rooms in this building for the confinement of the gentleman, the creditable but unfortunate artificer, and the most abandoned of the human race; in these rooms are they obliged to eat and sleep, and (if report speaks truth) it has happened that the different sexes have been locked into the same apartment. The prisoners have not the least outlet, where they can go to breathe the fresh air, or for any other necessary purpose. To add to the horrors of this gaol, there is not the least allowance of provisions either for common or crown debtors; and, if the persons who are so unfortunate as to be locked up here are not of a trade at which they can work in their confinement, they must not eat, unless their friends can afford to keep them, or the few who occasionally visit such scenes of distress cast in their mite to lighten but prolong their wretchedness.—The next tower of note is Fienes, or Newgate, or the Constable's Tower, still used as the governor's apartments. This noble building, which is raised upon the scite of a more ancient one; is after the design of Gundulph, who first introduced the high portal, and secured the passage with drawbridges, portcullisses, and massy gates.

It would have been much easier to have forced a passage through the walls of the castle than through this archway, which was defended by two portcullisses and two gates; and, when the bridge was drawn up, it might be considered as another gate, there being projections in the arch to support it. In the interior ditch you may descend, by a flight of stone steps, to a subterraneous vault, cut through the solid rock into the outer ditch.

The residence of the constable or governor of the castle was in the apartments in these towers after the Norman conquest; and it was here they heard and settled all disputes and controversies relative to the pay and the regulations of the garrison.—The porter generally stands at the door of a room under the arch on the left hand going into the castle, to invite travellers to see the ancient keys of the castle, and a few antique pictures which are kept there. They have an old horn, which tradition, to inhance its worth, tells us was used by the Romans, at the building of the castle, to give notice to the workmen, by the sounding of it, when to begin or to leave their work. We know it was an ancient custom, with the feudal lords, for the centinel to sound a horn for a signal at the gates of the castles upon their estates; and no doubt this was one of the horns used by the centinels here to sound an alarm, to give notice of the approach of strangers, or to convey from post to post, during the night, any alarm, or other notice.

We will next speak of Crevequer, or Cranville, or Earl of Norfolk's, Tower. This was built by one of the associated captains, and is situated opposite the north entrance into the quadrangle of the keep; but near it are several other towers, which have neither names nor lands assigned them. If these towers had been designed for appendages to Crevequer's Tower, they ought to have been included

cluded in his grant of lands, as all caſtle-guard tenures were obliged to be definite. It was not ſufficient for them to be in general words, "To defend the caſtle;" but it was required to be particularly expreſſed, "To defend a tower, a gate, a bridge, or ſome certain part of the caſtle." As this was the caſe, it is reaſonable to conclude that theſe towers were built after Henry VIII. paſſed an act to ſuppreſs all caſtle-guard tenures; but, from a ſubterraneous paſſage, which connected theſe towers with each other, it is probable that they are of higher antiquity.—Near this tower you deſcend by a flight of ſtone ſteps into the main ſally-port, which is wide and lofty, and part of it is cut through the ſolid rock. Near the entrance of this paſſage is a turning to the right hand, by which you proceed to a ſtone door-caſe, near the foundation of the wall of the caſtle, where there is another flight of ſteps, by which you again deſcend ſeveral feet, till you arrive at a paſſage, to the right and left, in the bank without the wall. The paſſage to the right is nearly filled up with rubbiſh, and it is not poſſible to crawl to the end of it; yet there is reaſon to believe that it never went farther than the tower in the angle to the right. On the left of the flight of ſteps you proceed in a ſubterraneous vault which forms ſeveral angles, and the direction was guided by the foundations of the towers. As the arch is ſtopped up, it is not eaſy to trace it to the place where it originally opened; but, if it did not lead into the main ſally-port, it led into a tower near it.—The tower in the ditch and the adjoining ſubterraneous works, are ſuppoſed by ſome to have been built by Hubert de Burgh, while the caſtle was beſieged by the dauphin, in the reign of King John; but this was probably impracticable, as it cannot be ſuppoſed that the beſiegers would have ſuffered the beſieged to have carried on ſuch a work, when they could ſo eaſily have prevented them. If this tower and the barbican were raiſed by Hubert de Burgh, it muſt have been in the interval of the dauphin's quitting the ſiege and returning to it again. That he might then erect them will indeed appear highly probable, when we conſider how indefatigable Hubert de Burgh was in fortifying and defending this caſtle for his ſovereign.—Lord St. John had a grant of Burleigh and Piſing in Kent, and Popeſhall in Hertfordſhire, to repair and defend it.

From St. John's Tower the ſally-port was continued acroſs the ditch, and entered the bank on the oppoſite ſide in a ſtrait direction, when it divided into three branches. The branch on the right hand, going out of the caſtle had a tower at, or near, the opening, the remains of which are ſtill to be ſeen in the ſide of the works; this was probably intended to cover the men in caſe they ſhould have been purſued by the enemy, upon their return to the caſtle after a ſally. How far the other two branches of this ſubterraneous work were continued, or whether they had any towers to guard their entrance next the country, like the other, cannot be determined by the preſent remaining works. It is certain they were continued farther than they now are; and the middle paſſage deſcends, though the other two aſcend, from the place where the three paſſages branch off.

There were ſeveral gates in different parts of this barbican, ſecured by ſtrong bolts and bars, to prevent or retard an enemy from proceeding into the caſtle, if they happened to force an entrance; which indeed was hardly practicable, the whole being ſo well defended by towers.

Crevequer's Tower was named Norfolk Tower, after Bigod earl of Norfolk, who had the command of it in the reign of Henry III. and a grant of the manors of Gravefend, Whitchling, and Sandling, in Kent, to repair it. The king, after his defeat at Lewes, was obliged by Leicefter (who had almoft all the royal family in his power) to fign an order to the governors of his caftles, to deliver them up to the barons; and this caftle, among the reft, was taken poffeffion of by the confederate troops. This being confidered as a place of fafety, Leicefter ufed to fend fuch perfons to be prifoners here as he chofe to keep in fafe cuftody. Prince Edward, after the defeat at Lewes, May the 14th, 1264, was fent and detained a prifoner here till the 28th of January in the following year; and then he was by an order of parliament delivered to the king, or, in other words, to Leicefter, (as he had the king under his command,) till the artifice fucceeded by which he made his efcape. Prince Edward, foon after his enlargement, raifed an army, and, on the 4th of Auguft in the fame year, defeated Leicefter at the battle of Evefham, whofe body was found among the flain.

After the death of the earl, his eldeft fon Simon Montfort, fearing the refentment of his fovereign, endeavoured to make Richard king of the Romans his friend, by releafing him without a ranfom from Kenelworth caftle where he had kept him a prifoner. The victory of Prince Edward was favourable to feveral prifoners taken at Lewes; but thofe at Dover caftle did not find immediate relief from it.

The barons of the cinque-ports, hearing the affairs of the king were growing more profperous, judged it neceffary to take charge of the caftle themfelves, and to fecure the prifoners. This news being brought to the king, Prince Edward prepared with all expedition to relieve his friends in Dover caftle, in cuftody of the barons. It being hazardous to abide too long with a weak party, the prudent barons of the ports, finding themfelves incapable of refifting for any length of time the forces coming againft them, wifely judged it would be more to their intereft to open a treaty before matters were pufhed to an extremity, as they might then lofe all; and, by holding out, there was but little profpect of getting any thing. In their articles of capitulation, they procured the honourable terms of keeping their horfes, armour, and all their military accoutrements, when they delivered up the caftle to the prince.

Paffing from the guard-houfe towards the hofpital, the firft tower in the wall is Fitzwilliam's, or St. John's, tower. Adam Fitzwilliam, the firft commander of this tower, attended William duke of Normandy into England, as marfhal of his army; and, for his valour in the memorable battle of Haftings, (where Harold king of England was flain,) the Conqueror gave him his fcarf from his own arm. There was formerly a noble and fpacious fally-port from this tower: the entrance to it in the caftle was in the Saxon ditch, on the right hand; and this, like the fubterraneous work at Crevequer's tower, was originally intended not for foot only, but for cavalry. In this paffage, under ground, there was a gate and portcullis; and the ftone grooves in which the latter moved are ftill remaining. It was probably drawn up by the fide of the tower within the caftle walls. The fally-port was continued from the back of the tower acrofs the ditch between two walls, which, for the greater fecurity, were

were probably arched over. An arch was turned in the mafon's work in the ditch, which, whilft it fupported the fide-walls, left a paffage through from one fide to the other; and above, between the two walls, the pafs feems to have been made good by a draw-bridge between the tower and the bank, on the oppofite fide of the ditch. This bridge was neceffary to ftop the progrefs of an enemy in cafe they had forced the work beyond it. In the part of the fally-port which is in the high ground beyond the ditch, there was a large gate which moved upon two pivots fixed in fockets in the wall, and was hoifted up by a pulley fixed in the top of the arch: by flackening the gate fuddenly, the weight of it would have driven every thing before it, if there had been any refiftance made by the enemy in a clofe purfuit. It has been generally fuppofed that there was formerly a fubterraneous paffage from Crevequer's tower to this, and from this to Avaranche's tower, in the next angle, where, as authors have informed us, it turned, and paffed on to Pincefter's tower, and thence to the Roman camp. If there be any fuch tracks remaining, they are not now to be traced without fome trouble and expence.

We will now proceed to defcribe the next tower, which is Avaranche's, or Maunfel's, tower, fituated in the angle near the hofpital. This is one of the nobleft remains of the Norman towers in the caftle. It was called Avaranche's from the firft commander. The Maunfel who fucceeded him, and got the tower called after his own name, was probably John Maunfel, a defcendant of Philip Maunfel, who came over with William the Conqueror, as he was a perfon of fome eminence, and lord-warden of the caftle in the reign of Henry III. Maunfel had a grant from the king of Malton and Alkham to defend and repair it.

This tower, by the prefent appearance of it, was built entirely for defence; as there was no conveniency in it even for the temporary refidence of a commander, unlefs there was originally another ftory more than there is left in the remaining ruin. The firft floor of this tower was a kind of vault arched with ftone but open in front; and in the wall, which is very thick, round part of this vault was a paffage where you might afcend by ftone fteps, in which paffage the archers might ftand, one above another, and command the ditch on each fide of the building through the loop-holes, as well as the approaches to it, from each fide of the curtain. By this gallery or paffage they afcended to the top of the firft vault, and came out upon a platform over it, which was alfo partly furrounded by a wall, but not near fo thick as that below. From this platform there is a circular ftaircafe of ftone leading to the top the tower. Exactly over the paffage in the wall below was another paffage covered with an arch fupported with piers; oppofite the interval between each pier were loop-holes in the walls of the tower which commanded the ditch; and near the end of the paffage there was a machecolation in the wall for pouring out fcalding water, burning fand, melted lead, or whatever the befieged pleafed, upon the heads of the affailants.

The next tower in the other angle is Veville, or Pincefter's tower. From this we will proceed to the following one, which is Earl Godwin's tower. This tower was built by Earl Godwin about the time of Canute the Great or Edward the Confeffor. He held by grant Goodneftone, near Sandwich, where he had his feat for this particular purpofe. At the back of this tower was a poftern, through which

was a way under ground that came into the caſtle upon the vallum which joined the Roman and Saxon work. It was through this ſally-port Stephen Pinceſter led his reinforcement to enable Hubert de Burgh to withſtand the dauphin.

In the beginning of the barons' wars, it is ſaid, the governor of Dover caſtle was a zealous partizan of the diſcontented nobles; but John prevailed upon him, by flattery, promiſes, and preſents, to deliver up the government of the caſtle to him. As the fortreſs was ſo advantageouſly ſituated to prevent the deſcent of his foreign enemies, he took care to ſelect a perſon attached to his intereſt, and one he could confide in, for this important truſt. Hubert de Burgh had diſtinguiſhed himſelf in the ſervice of his brother Richard; and the king, knowing him to be active, loyal, prudent, brave, and learned in the laws of his country, appointed him governor of Dover caſtle. He alſo raiſed him to the dignity of earl of Kent and chief juſticiary, by virtue of which office he could hold courts and aſſizes for the trial and puniſhment of malefactors; and this power continued with the lord-warden of the cinque ports after him. Hubert de Burgh, like every truly great and good man, was more intent upon diſcharging the duties of his office than enriching himſelf and his dependants at the expence of his ſovereign's welfare and the public ſafety; he therefore began with rectifying ſuch abuſes as he found had crept into the garriſon under former governors; and his aim was not only to correct but to aboliſh ſeveral old and adopt new regulations. As the king had the fulleſt confidence in the integrity and abilities of his new governor, Hubert de Burgh conld eaſily obtain the royal aſſent to give energy to his plans. As there were many who held land, and were bound by the nature of their tenure to give their perſonal attendance for the defence of the caſtle, he changed the nature of their ſervice, and they were obliged to pay 10s. each month to maintain a regular garriſon. By adopting this plan, he procured a number of men and officers, whom he trained to their duty; and they were no longer, as they had hitherto been, ignorant of the ſervice required of them. That they might not be taken by ſurpriſe, he ordered a watch to be kept during the night, either under the inſpection of the marſhal, or ſome proper officer of the guard. He ordered them to ſound a horn or a trumpet every hour, to keep their ſentinels awake at their reſpective poſts: the ſentinel at the great gate or entrance of the caſtle gave notice by the ſound of the trumpet of what paſſed there to the reſt of the garriſon. But, while Hubert de Burgh was correcting old abuſes, and introducing new regulations, he was obliged to prepare for the defence of the caſtle; as the dauphin, in conjunction with the diſaffected barons, made ſeveral attempts to wreſt it from him. It is ſaid the dauphin caſt up a work from the foot of the hill to the gate going into the caſtle, to cover his men; which work may ſtill be traced on the ſide of the hill next the town. This ſiege was ſeveral times raiſed and renewed between the fifteenth of John and the firſt of Henry III. When Stephen Pinceſter had led his reinforcement into the caſtle, with proper arms and engines for annoying the beſiegers, it gave ſuch ſpirits to the garriſon, and diſheartened the dauphin ſo much, that he gave up all hopes of ſubduing the caſtle by force: he next endeavoured to obtain it by praiſes and promiſes. William Long-ſword and Hubert de Burgh's youngeſt brother, with upwards of forty

forty barons more, were deputed to confer with him concerning the state of affairs, and to prevail with him, if poſſible, to capitulate; as they ſaid he had ſufficiently ſhewn his loyalty to his king: but the governor of the caſtle did not eſtimate his loyalty by paſt dangers; nor the reward of his valour from the promiſes of grants of large poſſeſſions from the enemies of his ſovereign; he refuſed, with the ſpirit of an Engliſhman, all the advantageous terms offered him; and the dauphin, tired out with fruitleſs attempts, was obliged to quit the ſiege, and leave his adverſary in quiet poſſeſſion of this important poſt. Hubert was liberally rewarded by the king for this ſingular attachment and ſervice; but he was not long permitted to enjoy the laurels he had earned, nor to eat the fruits of his toils in peace. After the acceſſion of Henry III. to the throne, he was accuſed by his enemies of crimes and miſdemeanors; and, by their intrigues, he was ſeized, caſt into priſon, and diſpoſſeſſed of his honours and eſtates. His friends ſo far prevailed by their interceſſions, as to procure his enlargement; and that was all they could obtain for him; and, when he had neither title nor property, envy did not diſcover any ground for murmurs and complaints, and his enemies were then at peace with him. After ſtruggling with a variety of misfortunes, he died at Banſted in Surry, in 1243.

Dover caſtle, in moſt of our civil commotions, generally attracted the attention of the leaders of each party; and, while one endeavoured to keep, the other ſtrove as much to get, poſſeſſion of it. So lately as Charles II. it was attempted and taken by ſurprize by a few men in the night. One Drake, a merchant, who was in oppoſition to the king, and a zealous partizan for the cauſe in which he was embarked, formed a plan to ſeize the garriſon; and the firſt of Auguſt, 1642, about midnight, was the time fixed upon to put it in execution: every thing being prepared for the attempt, he, with ten or twelve men, by the aſſiſtance of ropes and ſcaling ladders, reached the top of the high cliff, with their muſkets, undiſcovered. Drake was probably well acquainted with this part of the caſtle, and knew that it was left unguarded, as it was thought inacceſſible from the ſide next the ſea: having reached the ſummit unmoleſted, they proceeded immediately to the poſt where the ſentinel was placed, and, after ſecuring or killing him, they threw open the gates; and the garriſon, being few in number, and in the confuſion of the night concluding he had a ſtrong party with him, the officer on command ſurrendered up the caſtle to them. Drake immediately diſpatched a meſſenger to Canterbury with the news of his ſucceſs; and, the Earl of Warwick being there, he ſent him fifty men, and the city ſeventy, to guard and defend the caſtle.

PYROTECHNY; OR THE ART OF PREPARING ALL KINDS OF FIRE-WORKS.—Continued from p. 39.

OF MOULDS, CASES, MIXTURE, INSTRUMENTS, &c.

Rocket Moulds.

AS the performance of rockets depends much on their moulds, it is requiſite to give a definition of them and their proportions:—They are made and proportioned by the diameter of their orifice, which are divided into parts.

The

The rammers ſhould have a collar of braſs at the bottom, to keep the wood from ſpreading or ſplitting, and the ſame proportion muſt be given to all moulds from 1 oz. to 6 lb. The handles of the rammers ſhould be equal to the bore of the mould, and 2 diameters long; but the ſhorter you can uſe them, the better; for the longer the drift, the leſs will be the preſſure on the compoſition by the blow given with the mallet.

Dimenſions for Rocket Moulds, if the Rockets are rammed ſolid.

Weight of Rockets.		Length of Moulds without their Feet.	Interior Diameter of the Moulds.	Height of the Nipples.
lb.	oz.	Inches.	Inches.	Inches.
6	0	34,7	3,5	1,5
4	0	38,6	2,9	1,4
2	0	13,35	2,1	1,0
1	0	12,25	1,7	0,85
0	8	10,125	1,333, &c.	0,6
0	4	7,75	1,125	0,5
0	2	6,2	0,9	0,45
0	1	4,9	0,7	0,35
0	½	3,9	0,55	0,25
6 drams		3,5	0,5	0,225
4 drams		2,2	0,3	0,2

The diameter of the nipple muſt always be equal to that of the former. Thoſe who make rockets for private amuſement, ſhould not ram them ſolid; for it requires a very ſkilful hand, and an expenſive apparatus for boring them. Driving of rockets ſolid is the moſt expeditious method, but not ſo certain as ramming them over a piercer.

To roll Rocket and other Caſes.—Sky-rocket caſes are to be made 6½ of their exterior diameter long; and all other caſes that are to be filled in moulds muſt be as long as the moulds, within half its interior diameter. Rocket-caſes, from the ſmalleſt to 4 or 6 lb. are generally made of the ſtrongeſt ſort of cartridge paper, and rolled dry; but the large ſort are made of paſted paſteboard. As it is very difficult to roll the ends of the caſes quite even, the beſt way will be to keep a pattern of the paper for the different ſorts of caſes; which pattern ſhould be ſomewhat longer than the caſe it is deſigned for, and on it marked the number of ſheets required, which will prevent any paper being cut to waſte. Having cut your papers of a proper ſize, and the laſt ſheet for each caſe with a ſlope at one end, ſo that when the caſes are rolled it may form a ſpiral line round the outſide, and that this ſlope may always be the ſame, let the pattern be ſo cut for a guide. Before you begin to roll, fold down one end of the firſt ſheet, ſo far that the fold will go two or three times round the former: then, on the double edge, lay the former with its handle off the table; and when you have rolled on the paper within two or three turns, lay the next ſheet on that part which is looſe, and roll it all on.

Having thus done, you muſt have a ſmooth board, about twenty inches long, and equal in breadth to the length of the caſe. In the middle of this board muſt be a handle placed lengthwiſe. Under this board lay your caſe, and let one end of the board lie on the table; then preſs hard on it, and puſh it forwards, which will roll

roll the paper very tight: do this three or four times before you roll on any more paper. This muſt be repeated every other ſheet of paper, till the caſe is thick enough; but, if the rolling board be drawn backwards, it will looſen the paper: you are to obſerve, when you roll on the laſt ſheet, that the point of the ſlope be placed at the ſmall end of the roller. Having rolled your caſe to fit the mould, puſh in the ſmall end of the former about 1 diameter from the end of the caſe, and put in the end-piece within a little diſtance of the former; then give the pinching cord one turn round the caſe, between the former and the end-piece; at firſt pull eaſy, and keep moving the caſe, which will make the neck ſmooth, and without large wrinkles. When the caſes are hard to choak, let each ſheet of paper (except the firſt and laſt, in that part where the neck is formed) be a little moiſtened with water: immediately after you have ſtruck the concave ſtroke, bind the neck of the caſe round with ſmall twine, which muſt not be tied in a knot, but faſtened with two or three hitches.

Having thus pinched and tied the caſe ſo as not to give way, put it into the mould without its foot, and with a mallet drive the former hard on the end-piece, which will force the neck cloſe and ſmooth. This done, cut the caſe to its proper length, allowing from the neck to the edge of the mouth half a diameter, which is equal to the height of the nipple; then take out the former, and drive the caſe over the piercer with the long rammer, and the vent will be of a proper ſize. Wheel-caſes muſt be drove on a nipple with a point to cloſe the neck, and make the vent of the ſize required; which, in moſt caſes, is generally $\frac{1}{4}$ of their interior diameter. As it is very often difficult, when the caſes are rolled, to draw the roller out, you may make a hole through the handle, and put in it a ſmall iron pin, by which you may eaſily turn the former round and pull it out.

Caſes are commonly rolled wet, for wheels and fixed pieces; and when they are required to contain a great length of charge, the method of making thoſe caſes is thus: Your paper muſt be cut as uſual, only the laſt ſheet muſt not be cut with a ſlope: having your paper ready, paſte each ſheet on one ſide; then fold down the firſt ſheet as before directed: but be careful that the paſte do not touch the upper part of the fold; for, if the roller be wetted, it will tear the paper in drawing it out. In paſting the laſt ſheet, obſerve not to wet the laſt turn or two in that part where it is to be pinched; for, if that part be damp, the pinching cord will ſtick to it, and tear the paper; therefore, when you choak thoſe caſes, roll a bit of dry paper once round the caſe, before you put on the pinching cord; but this bit of paper muſt be taken off after the caſe is choaked. The rolling board, and all other methods, according to the former directions for the rolling and pinching of caſes, muſt be uſed to theſe as well as all other caſes.

To make Tourbillon Caſes.—Thoſe ſort of caſes are generally made about 8 diameters long; but if very large 7 will be ſufficient: tourbillons will anſwer very well from 4 oz. to 2 lb. but when larger there is no certainty. The caſes are beſt rolled wet with paſte, and the laſt ſheet muſt have a ſtraight edge, ſo that the caſe may be all of a thickneſs: when you have rolled your caſes after the manner of wheel-caſes, pinch them at one end quite cloſe; then with the rammer drive the ends down flat, and afterwards ram in about $\frac{1}{3}$ of a diameter of dried clay. The diameter of the former for theſe caſes muſt be the

ſame as for ſky-rockets. Tourbillons are to be rammed in moulds without a nipple, or in a mould without its foot.

Balloon Caſes, or Paper Shells.—Firſt, you muſt have an oval former turned of ſmooth wood; then paſte a quantity of brown or cartridge paper, and let it lie till the paſte has quite ſoaked through; this done, rub the former with ſoap or greaſe, to prevent the paper from ſticking to it; then lay the paper on in ſmall ſlips, till you have made it $\frac{1}{3}$ of the thickneſs of the ſhell intended. Having thus done, ſet it to dry; and, when dry, cut it round the middle, and the two halves will eaſily come off: but obſerve, when you cut, to leave about 1 inch not cut, which will make the halves join much better than if quite ſeparated. When you have ſome ready to join, place the halves even together, paſte a ſlip of paper round the opening to hold them together, and let that dry; then lay on paper all over as before, everywhere equal, excepting that end which goes downwards in the mortar, which may be a little thicker than the reſt; for that part which receives the blow from the powder in the chamber of the mortar conſequently requires the greateſt ſtrength. When the ſhell is thoroughly dry, burn a round vent at top, with ſquare iron, large enough for the fuze: this method will do for balloons from $4\frac{2}{5}$ inches to 8 inches diameter; but if they are larger, or required to be thrown a great height, let the firſt ſhell be turned of elm, inſtead of being made of paper.

For a balloon of $4\frac{2}{5}$ inches, let the former be 3 inches $\frac{1}{8}$ diameter, and $5\frac{1}{2}$ inches long. For a balloon of $5\frac{1}{2}$ inches, the diameter of the former muſt be 4 inches, and 8 inches long. For a balloon of 8 inches, let the diameter of the former be 5 inches and $\frac{15}{16}$, and $11\frac{7}{8}$ long. For a 10-inch balloon, let the former be $7\frac{3}{16}$ diameter, and $14\frac{1}{2}$ inches long. The thickneſs of a ſhell for a balloon of $4\frac{2}{5}$ inches muſt be $\frac{1}{2}$ inch. For a balloon of $5\frac{1}{2}$ inches, let the thickneſs of the paper be $\frac{5}{8}$ of an inch. For an 8-inch balloon, $\frac{7}{8}$ of an inch. And for a 10-inch balloon, let the ſhell be $1\frac{1}{8}$ inch thick.

Shells that are deſigned for ſtars only, may be made quite round, and the thinner they are at the opening, the better; for if they are too ſtrong, the ſtars are apt to break at the burſting of the ſhell: when you are making the ſhell, make uſe of a pair of calibres, or a round gage, ſo that you may not lay the paper thicker in one place than another; and alſo to know when the ſhell is of a proper thickneſs. Balloons muſt always be made to go eaſy into the mortars.

Caſes for illumination Port-fires.—Theſe muſt be made very thin of paper, and rolled on formers, from $\frac{1}{4}$ to $\frac{5}{8}$ of an inch diameter, and from 2 to 6 inches long: they are pinched cloſe at one end, and left open at the other. When you fill them, put in but a little compoſition at a time, and ram it in lightly, ſo as not to break the caſe: 3 or 4 rounds of paper, with the laſt round paſted, will be ſtrong enough for theſe caſes.

Caſes and Moulds for common Port-fires.—Common port-fires are intended purpoſely to fire the works, their fire being very ſlow, and the heat of the flame ſo intenſe, that, if applied to rockets, leaders, &c. it will fire them immediately. Port-fires may be made of any length, but are ſeldom made more than 21 inches long: the interior diameter of port-fire moulds ſhould be $\frac{10}{16}$ of an inch, and the diameter of the former $\frac{1}{2}$ an inch. The caſes muſt be rolled wet with paſte, and one end pinched, or folded down. The moulds ſhould be

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made of brafs, and to take in two pieces lengthwife ; when the cafe is in the two fides, they are held together by brafs rings, or hoops, which are made to fit over the outfide. The bore of the mould muft not be made quite through, fo that there will be no occafion for a foot. Thofe port-fires, when ufed, are held in copper fockets, fixed on the end of a long ftick : thefe fockets are made like port-crayons, only with a fcrew inftead of a ring.

Of mixing the Compofitions.—The performance of the principal part of fire-works depends much on the compofitions being well mixed ; therefore great care muft be taken in this part of the work, particularly for the compofition for fky-rockets. When you have four or five pounds of ingredients to mix, which is a fufficient quantity at a time (for a larger proportion will not do fo well), firft put the different ingredients together ; then work them about with your hands, till you think they are pretty well incorporated : after which put them into a lawn fieve with a receiver and top to it ; and if, after it is fifted, any remains that will not pafs through the fieve, grind it again till fine enough ; and, if it be twice fifted, it will not be amifs; but the compofitions for wheels and common works are not fo material, nor need be fo fine. But in all fixed works, from which the fire is to play regular, the ingredients muft be very fine, and great care taken in mixing them well together ; and obferve, that in all compofitions wherein are fteel or iron filings, the hands muft not touch ; nor will any works which have iron or fteel in their charge keep long in damp weather, unlefs properly prepared, according to the following directions.

To perferve Steel or Iron Filings.—It fometimes may happen, that fire-works may be required to be kept a long time, or fent abroad ; neither of which could be done with brilliant fires, if made with filings unprepared ; for this reafon, that the faltpetre being of a damp nature, it caufes the iron to ruft ; the confequence of which is, that, when the works are fired, there will appear but very few brilliant fparks, but inftead of them a number of red and droffy fparks; and befides, the charge will be fo much weakened, that if this was to happen to wheels, the fire will hardly be ftrong enough to force them round. But, to prevent fuch accidents, prepare your filings thus :—Melt in a glazed earthen pan fome brimftone over a flow fire, and when melted throw in fome filings ; which keep ftirring about till they are covered with brimftone : this you muft do while it is on the fire ; then take it off, and ftir it very quick till cold, when you muft roll it on a board with a wooden roller, till you have broke it as fine as corn powder ; after which fift from it as much of the brimftone as you can. There is another method of preparing filings, fo as to keep two or three months in winter ; this may be done by rubbing them between the ftrongeft fort of brown paper, which before has been moiftened with linfeed oil. If the brimftone fhould take fire, you may put it out, by covering the pan clofe at top : it is not of much fignification what quantity of brimftone you ufe, fo that there is enough to give each grain of iron a coat ; but as much as will cover the bottom of a pan of about 1 foot diameter, will do for 5 or 6 pound of filings, or caft-iron for gerbes.

To drive or ram Sky-rockets, &c.—Rockets drove over a piercer muft not have fo much compofition put in them at a time as when drove folid ; for the piercer, taking up a great part of the bore of the cafe,

would cause the rammer to rise too high; so that the pressure of it would not be so great on the composition, nor would it be drove every where equal. To prevent this, observe the following rule:— That for those rockets which are rammed over a piercer, let the ladle hold as much composition as, when drove, will raise the drift $\frac{1}{2}$ the interior diameter of the case, and for those drove solid to contain as much as will raise it $\frac{1}{2}$ the exterior diameter of the case: ladles are generally made to go easy in the case, and the length of the scoop about $1\frac{1}{2}$ of its own diameter.

The charge of rockets must always be drove 1 diameter above the piercer, and on it must be rammed $\frac{1}{3}$ of a diameter of clay: through the middle of which bore a small hole to the composition, that, when the charge is burnt to the top, it may communicate its fire, through the hole, to the stars in the head. Great care must be taken to strike with the mallet, and with an equal force, the same number of strokes to each ladlefull of charge; otherwise the rockets will not rise with an uniform motion, nor will the composition burn equal and regular: for which reason they cannot carry a proper tail; for it will break before the rocket has got half way up, instead of reaching from the ground to the top, where the rocket breaks and disperses the stars, rains, or whatever is contained in the head. When you are ramming, keep the drift constantly turning or moving; and, when you use the hollow rammers, knock out of them the composition now and then, or the piercer will split them. To a rocket of 4 oz. give to each ladle-full of charge 16 strokes; to a rocket of 1 lb. 28; to a 2-pounder, 36; to a 4-pounder, 42; and to a 6-pounder, 56: but rockets of a larger sort cannot be drove well by hand, but must be rammed with a machine made in the same manner as those for driving piles.

The method of ramming of wheel-cases, or any other sort, in which the charge is drove solid, is much the same as sky-rockets; for the same proportion may be observed in the ladle, and the same number of strokes given, according to their diameters, all cases being distinguished by their diameters. In this manner, a case, whose bore is equal to a rocket of 4 oz. is called a 4-oz. case, and that which is equal to an 8-oz. rocket an 8-oz. case, and so on, according to the different rockets.

Having taught the method of ramming cases in moulds, we shall here say something concerning those filled without moulds; which method, for strong pasted cases, will do extremely well, and save the expence of making so many moulds. The reader must here observe, when he fills any sort of cases, to place the mould on a perpendicular block of wood, and not on any place that is hollow; for we have found by experience, that when cases were rammed on driving benches, which were formerly used, the works frequently miscarried, on account of the hollow resistance of the benches, which oft jarred and loosened the charge in the cases; but this accident never happens when the driving blocks are used.

When cases are to be filled without moulds, proceed thus. Have some nipples made of brass or iron, of several sorts and sizes, in proportion to the cases, and to screw or fix in the top of the driving block; when you have fixed in a nipple, make, at about $1\frac{1}{2}$ inch from it, a square hole in the block, six inches deep and one inch diameter; then have a piece of wood, 6 inches longer than the case intended

intended to be filled, and 2 inches square; on one side of it cut a groove almost the length of the case, whose breadth and depth must be sufficient to cover near $\frac{1}{3}$ the case; then cut the other end to fit the hole in the block, but take care to cut it so that the groove may be of a proper distance from the nipple; this half-mould being made and fixed tight in the block, cut, in another piece of wood nearly of the same length as the case, a groove of the same dimensions as that in the fixed piece; then put the case on the nipple, and with a cord tie it and the 2 half-moulds together, and your case will be ready for filling.

The dimensions of the above-described half-moulds are proportionable for cases of 8 ounces; but notice must be taken, that they differ in size in proportion to the cases. The clay, mentioned in this article, must be prepared after this manner:—Get some clay, in which there is no stones nor sand, and bake it in an oven till quite dry; then take it out and beat it to a powder, and afterwards sift it through a common hair-sieve, and it will be fit for use.

Proportion of Mallets.—The best wood for mallets is dry beech. If a person uses a mallet of a moderate size, in proportion to the rocket, according to his judgment, and if the rocket succeeds, he may depend on the rest, by using the same mallet; yet it will be necessary that cases of different sorts be drove with mallets of different sizes.

The following proportion of the mallets for rockets of any size, from 1 oz. to 6 lb. may be observed; but as rockets are seldom made less than 1 oz. or larger than 6 lb. we shall leave the management of them to the curious; but all cases under 1 oz. may be rammed with an oz. rocket-mallet. Your mallets will strike more solid, by having their handles turned out of the same piece as the head, and made in a cylindrical form. Let their dimensions be worked by the diameters of the rockets: for example; let the thickness of the head be 3 diameters, and its length 4, and the length of the handle 5 diameters, whose thickness must be in proportion to the hand.

Manner of heading Rockets.—When the collar is to be glued on the rocket, you must cut two or three rounds of paper off the case, which will make a shoulder for it to rest upon. Two or three rounds of paper well pasted will be enough for the head, which, when rolled, put the collar on, which must fit the inside of it; then, with the pinching cord pinch the bottom of the head into the groove, and tie it with small twine. To make the caps, cut your paper in round pieces, equal in diameter to twice the length of the cone you intend to make; which pieces being cut into halves, will make two caps each, without wasting any paper; having formed the caps, paste over each of them a thin white paper, which must be a little longer than the cone, so as to project about $\frac{1}{2}$ an inch below the bottom: this projection of paper, being notched and pasted, serves to fasten the cap to the head.

When you load the heads of your rockets, with stars, rains, serpents, crackers, scrolls, or any thing else, according to your fancy, remember always to put 1 ladlefull of meal-powder into each head, which will be enough to burst the head, and disperse the stars, or whatever it contains: when the heads are loaded with any sort of cases, let their mouths be placed downwards; and after the heads are filled, paste on the top of them a piece of paper, before you put on the caps. As the size of the stars often differ, it would be needless

lefs to give an exact number for each rocket; but this rule may be obferved, that the heads may be nearly filled with whatever they are loaded.

Decorations for Sky-rockets.—Sky-rockets bearing the pre-eminence of all fire-works, it will not be improper to treat of their various kinds of decorations, which are directed according to fancy. Some are headed with ftars of different forts, fuch as tailed, brilliant, white, blue, and yellow, ftars, &c. fome with gold and filver rain; others with ferpents, crackers, firefcrolls, marrons; and fome with fmall rockets, and many other devices, as the maker pleafes.

Dimenfions and Poife of Rocket-fticks.

Weight of the Rocket		Length of the Stick.		Thicknefs at Top.	Breadth at Top.	Square at Bottom.	Poife from the Point of the Cone.	
lb.	oz.	F.	in.	Inches.	Inches.	Inches.	F.	in.
6	0	14	0	1,5	1,85	0,75	4	1,5
4	0	12	10	1,25	1,40	0,625	3	9,
2	0	9	4	1,125	1,	0,525	2	9,
1	0	8	2	0,725	0,80	0,375	2	1,
	8	6	6	0,5	0,70	0,25	1	10,4
	4	5	3	0,3750	0,55	0,35	1	8,5
	2	4	1	0,3	0,45	0,15	1	3,
	1	3	6	0,25	0,35	0,10	10	0,
	$\frac{1}{2}$	2	4	0,125	0,20	0,16	8	0,
	$\frac{1}{4}$	1	$10\frac{1}{2}$	0,1	0,15	0,5	5	0,5

The laft column on the right, in the above table, expreffes the diftance from the top of the cone, where the ftick, when tied on, fhould balance the rocket, fo as to ftand in an equilibrium on one's finger or the edge of a knife. The beft wood for the fticks is dry deal, made thus. When you have cut and planed the fticks according to the dimenfions given in the table, cut, on one of the flat fides at the top, a groove the length of the rocket, and as broad as the ftick will allow; then, on the oppofite flat fide, cut two notches for the cord, which ties on the rocket, to lie in; one of thefe notches muft be near the top of the ftick, and the other facing the neck of the rockets; the diftance between thefe notches may eafily be known, for the top of the ftick fhould always touch the head of the rocket. When your rockets and fticks are ready, lay the rockets in the grooves in the fticks, and tie them on. Thofe who, merely for curiofity, may choofe to make rockets of different fizes from thofe expreffed in the table of dimenfions, may find the length of their fticks, by making them, for rockets from $\frac{1}{2}$ oz. to 1 lb. 60 diameters of the rocket long; and for rockets above 1 lb. 50 or 52 diameters will be a good length; their thicknefs at top may be about $\frac{1}{2}$ a diameter, and their breadth a very little more; their fquare at bottom is generally equal to $\frac{1}{2}$ the thicknefs at the top. But, although the dimenfions of the fticks be very nicely obferved, you muft depend only on their balance; for, without a proper counterpoife, your rockets, inftead of mounting perpendicularly, will take an oblique direction, and fall to the ground before they are burnt out.

(*To be continued.*)

DESCRIPTION

DESCRIPTION OF THE ROCKING STONES.

THE Logan ſtone is of a prodigious ſize, ſo exactly poiſed, that it would rock or ſhake with the ſmalleſt force. Of theſe ſtones the ancients give us ſome account. Pliny ſays, that at Harpaſa, a town of Aſia, there was a rock of ſuch a wonderful nature, that if touched with the finger it would ſhake, but could not be moved from its place with the whole force of the body. Ptolemy Hepheſtion mentions a gygonion ſtone near the ocean, which was agitated when ſtruck by the ſtalk of an aſphodel, but could not be removed by a great exertion of force. The word *gygonian* ſeems to be Celtic; for *gwingog* ſignifies *motitans*, the rocking-ſtone.

Many rocking ſtones are to be found in different parts of this iſland; ſome natural, others artificial, or placed in their poſition by human art. In the pariſh of St. Leven, Cornwall, there is a promontary called *Caſtle Treryn*. On the weſtern ſide of the middle group, near the top, lies a very large ſtone, ſo evenly poiſed that any hand may move it from one ſide to another; yet it is ſo fixed on its baſe, that no lever, nor any mechanical force, can remove it from its preſent ſituation. It is called the *Logan-ſtone*, and is at ſuch a height from the ground that no perſon can believe that it was raiſed to its preſent poſition by art. But there are other rocking ſtones, which are ſo ſhaped, and ſo ſituated, that there can be no doubt but they were erected by human ſtrength. Of this kind Borlaſe thinks the great *Quoit* or *Karn-lehau*, in the pariſh of Tywidnek, to be. It is thirty-nine feet in circumference, and four feet thick at a medium, and ſtands on a ſingle pedeſtal. There is alſo a remarkable ſtone of the ſame kind in the iſland of St. Agnes in Scilly. The under rock is ten feet ſix inches high, forty-ſeven feet round the middle, and touches the ground with no more than half its baſe. The upper rock reſts on one point only, and is ſo nicely balanced, that two or three men with a pole can move it. It is eight feet ſix inches high, and forty-ſeven in circumference. On the top there is a baſon hollowed out, three feet eleven inches in diameter at a medium, but wider at the brim, and three feet deep. From the globular ſhape of this upper ſtone, it is highly probable that it was rounded by human art, and perhaps even placed on its pedeſtal by human ſtrength. In Sithney pariſh, near Helſton, in Cornwall, ſtood the famous logan, or rocking-ſtone, commonly called *Men Amber*, q. d. *Men an Bar*, or the *top-ſtone*. It was eleven feet by ſix, and four high, and ſo nicely poiſed on another ſtone that a little child could move it, and all travellers who came this way deſired to ſee it. But Shrubſall, Cromwell's governor of Pendennis, with much ado cauſed it to be undermined, to the great grief of the country. There are ſome marks of the tool on it, and, by its quadrangular ſhape, it was probably dedicated to Mercury.

That the rocking ſtones are monuments erected by the Druids cannot be doubted; but tradition has not informed us for what purpoſe they were intended. Mr. Toland thinks that the Druids made the people believe that they alone could move them, and that by a miracle; and that by this pretended miracle they condemned or acquitted the accuſed, and brought criminals to confeſs what could not otherwiſe be extorted from them. How far this conjecture is right we

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ſhall leave to thoſe who are deeply verſed in the knowledge of antiquities to determine.

There are likewiſe ſonorous ſtones, remarkable for emitting an agreeable ſound when ſtruck, and much uſed in China for making muſical inſtruments which they call *king.*—The various kinds of ſonorous ſtones known in China differ conſiderably from one another in beauty, and in the ſtrength and duration of their tone; and what is very ſurpriſing, is, that this difference cannot be diſcovered either by the different degrees of their hardneſs, weight, or fineneſs of grain, or by any other qualities which might be ſuppoſed to determine it. Some ſtones are found remarkably hard, which are very ſonorous; and others exceedingly ſoft, which have an excellent tone; ſome extremely heavy emit a very ſweet ſound; and there are others as light as pumice-ſtone which have alſo an agreeable ſound.

The chemiſts and naturaliſts of Europe have never yet attempted to diſcover, whether ſome of our ſtones may not have the ſame properties as the ſonorous ſtones of the extremities of Aſia. It however appears, that the Romans were formerly acquainted with a ſonorous ſtone of the claſs of *hiang-che.* Pliny (ſays the Abbé du Bos, in his Reflections on Poetry and Painting, when ſpeaking of curious ſtones) obſerves that the ſtone called *chalcophonas*, or *brazen ſound*, is black; and that, according to the etymology of its name, it ſends forth a ſound much reſembling that of braſs when it is ſtruck. The paſſage of Pliny is as follows:—*Chalcophonas nigra eſt; ſed eliſa æris tinnitum reddit.*

Some ſonorous ſtones have been ſent into France, and the late Duke de Chaulnes examined them with particular attention. The following are ſome of his obſervations: "The Academy of Sciences, Mr. Romé de Liſle, and ſeveral other learned mineralogiſts, when aſked if they were acquainted with the black ſtone of which the Chineſe king was made, for anſwer cited the paſſage of Pliny mentioned by Boethius de Bott, Linnæus, and in the Dictionary of Bomare, and added what Mr. Anderſon ſays in his Natural Hiſtory of Iceland reſpecting a bluiſh kind of ſtone which is very ſonorous. As the black ſtone of the Chineſe becomes of a bluiſh colour when filed, it is probably of the ſame ſpecies. None of the reſt who were conſulted had ever ſeen it. The Chineſe ſtone has a great reſemblance at firſt ſight to black marble, and like it is calcareous; but marble generally is not ſonorous. It alſo externally reſembles touchſtone, which is a kind of baſaltes, and the baſaltes found near volcanos; but theſe two ſtones are vitrifications."

The duke next endeavoured to procure ſome information from the ſtone-cutters. They all replied, that blue-coloured marble was very ſonorous, and that they had ſeen large blocks of it which emitted a very ſtrong ſound; but, the duke having ordered a king to be conſtructed of this kind of ſtone, it was found that it did not poſſeſs that property. By trying the black marble of Flanders, a piece was at length found which emitted an agreeable ſound: it was cut into a king, which is almoſt as ſonorous as thoſe of China. All theſe obſervations give us reaſon to believe that the ſtones of which the king are formed are nothing elſe but a black kind of marble, the conſtituent parts of which are the ſame as thoſe of the marble of Europe, but that ſome difference in their organization renders them more or leſs ſonorous.

On

ON THE ORIGIN OF SPRINGS.

VARIOUS have been the conjectures of philofophers concerning the origin of fountains, and great pains have been taken, both by the members of the Royal Society and thofe of the Academy of Sciences at Paris, in order to afcertain the true caufe of it. It was Ariftotle's opinion, and held by moft of the ancient philofophers after him, that the air contained in the caverns of the earth, being condenfed by cold near its furface, was thereby changed into water; and that it made its way through where it could find a paffage. But we have no experience of any fuch tranfmutation of air into water.

Thofe who imagine that fountains owe their origin to waters brought from the fea by fubterraneous ducts, give a tolerable account how they lofe their faltnefs by percolation as they pafs through the earth: but they find great difficulty in explaining by what power the water rifes above the level of the fea to near the tops of mountains, where fprings generally abound; it being contrary to the laws of hydroftatics, that a fluid fhould rife in a tube above the level of its fource. However, they have found two ways whereby they endeavour to extricate themfelves from this difficulty. The one is that of Des Cartes, who imagines, that, after the water is become frefh by percolation, it is raifed out of the caverns of the earth in vapour towards its furface; where, meeting with rocks near the tops of mountains in the form of arches or vaults, it fticks to them, and runs down their fides, (like water in an alembic,) till it meets with proper receptacles, from which it fupplies the fountains. Now this is a mere hypothefis, without foundation or probability; for, in the firft place, we know of no internal heat of the earth to caufe fuch evaporation; or, if that were allowed, yet it is quite incredible that there fhould be any caverns fo fmooth and void of protuberances as to anfwer the ends of an alembic, in collecting and condenfing the vapours together in every place where fountains arife. There are others (as Varenius, &c.) who fuppofe that the water may rife through the pores of the earth, as through capillary tubes by attraction. But hereby they fhew, that they are quite unacquainted with what relates to the motion of a fluid through fuch tubes: for when a capillary tube opens into a cavity at its upper end, or grows larger and larger, fo as to ceafe to be capillary at that end, the water will not afcend through that tube into the cavity, or beyond where the tube is capillary; becaufe that part of the periphery of the cavity, which is partly above the furface of the water and partly below it, is not of the capillary kind. Nay, if the cavity is continually fupplied with water, it will be attracted into the capillary tube, and run down it as through a funnel, if the lower end is immerged in the fame fluid, as in this cafe it is fuppofed to be.

It has been a generally-received opinion, and much efpoufed by Mariotte (a diligent obferver of nature), that the rife of fprings is owing to the rains and melted fnow. According to him, the rain-water which falls upon the hills and mountains, penetrating the furface, meets with clay or rocks contiguous to each other; along which it runs, without being able to penetrate them, till, being got to the bottom of the mountain, or to a confiderable diftance from the top, it breaks out of the ground, and forms fprings.

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In order to examine this opinion, Mr. Perrault, De la Hire, and D. Sideleau, endeavoured to make an eſtimate of the quantity of rain and ſnow that falls in the ſpace of a year, to ſee whether it would be ſufficient to afford a quantity of water equal to that which is annually diſcharged into the ſea by the rivers. The reſult of their inquiries was, that the quantity of rain and ſnow which fell in a year into a cylindrical veſſel would fill it (if ſecured from evaporating) to the height of about nineteen inches. Which quantity D. Sideleau ſhewed, was not ſufficient to ſupply the rivers; for that thoſe of England, Ireland, and Spain, diſcharge a greater quantity of water annually, than the rain, according to that experiment, is able to ſupply. Beſides which, another obſervation was made by them at the ſame time, viz. that the quantity of water raiſed in vapour, one year with another, amounted to about thirty-two inches, which is thirteen more than falls in rain: a plain indication that the water of fountains is not ſupplied by rain and melted ſnow.

Thus the true cauſe of the origin of fountains remained undiſcovered, till Dr. Halley, in making his celeſtial obſervations upon the tops of the mountains at St. Helena, about eight hundred yards above the level of the ſea, found, that the quantity of vapour which fell there (even when the ſky was clear) was ſo great, that it very much impeded his obſervations, by covering his glaſſes with water every half quarter of an hour; and upon that he attempted to determine by experiment the quantity of vapour exhaled from the ſurface of the ſea, as far as it riſes from heat, in order to try whether that might be a ſufficient ſupply for the water continually diſcharged by fountains. The proceſs of his experiment was as follows:—He took a veſſel of water ſalted to the ſame degree with that of ſea-water, in which he placed a thermometer; and by means of a pan of coals brought the water to the ſame degree of heat which is obſerved to be that of the air in our hotteſt ſummer; this done, he fixed the veſſel of water with the thermometer in it to one end of a pair of ſcales, and exactly counterpoiſed it with weights on the other: then, at the end of two hours, he found, by the alteration made in the weight of the veſſel, that about a ſixtieth part of an inch of the depth of the water was gone off in vapour; and therefore, in twelve hours, one-tenth of an inch would have gone off. Now this very accurate obſerver allows the Mediterranean Sea to be forty degrees long and four broad, (the broader parts compenſating for the narrower, ſo that its whole ſurface is 160 ſquare degrees;) which, according to the experiment, muſt yield at leaſt 5,280,000,000 tons of water:—in which account no regard is had to the wind and the agitation of the ſurface of the ſea, both which undoubtedly promote the evaporation.

It remained now to compare this quantity of water with that which is daily conveyed into the ſame ſea by the rivers. The only way to do which was to compare them with ſome known river; and accordingly he takes his computation from the river Thames; and, to avoid all objections, makes allowances, probably greater than what were abſolutely neceſſary.

The Mediterranean receives the following conſiderable rivers, viz. the Iberus, the Rhone, the Tyber, the Po, the Danube, the Nieſter, the Boryſthenes, the Tanais, and the Nile. Each of theſe he ſuppoſes to bring down ten times as much water as the Thames, whereby

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he allows for fmaller rivers which fall into the fame fea. The Thames, then, he finds by menfuration to difcharge about 20,300,000 tons of water a-day. If therefore the above-faid nine rivers yield ten times as much water as the Thames doth, it will follow that all of them together yield but 1827 millions of tons in a day, which is but little more than one-third of what is proved to be raifed in vapour out of the Mediterranean in the fame time. We have therefore from hence a fource abundantly fufficient for the fupply of fountains.

Now, having found that the vapour exhaled from the fea is a fufficient fupply for the fountains, he proceeds in the next place to confider the manner in which they are raifed; and how they are condenfed into water again, and conveyed to the fources of fprings.

In order to this he confiders, that, if an atom of water were expanded into a fhell or bubble fo as to be ten times as big in diameter as when it was water, that atom would become fpecifically lighter than air; and therefore would rife fo long as the warmth which firft feparated it from the furface of the water fhould continue to diftend it to the fame degree; and confequently, that vapours may be raifed from the furface of the fea in that manner, till they arrive at a certain height in the atmofphere, at which they find air of equal fpecific gravity with themfelves. Here they will float till, being condenfed by cold, they become fpecifically heavier than the air, and fall down in dew; or being driven by the winds againft the fides of mountains (many of which far furpafs the ufual height to which the vapours would of themfelves afcend), are compelled by the ftream of the air to mount up with it to the tops of them; where being condenfed into water, they prefently precipitate, and gleeting down by the crannies of the ftones, part of them enters into the caverns of the hills; which being once filled, all the overplus of water that comes thither runs over by the loweft place, and breaking out by the fides of the hills forms fingle fprings. Many of thefe running down by the valleys between the ridges of the hills, and coming to unite, form little rivulets or brooks: many of thefe again meeting in one common valley, and gaining the plain ground, being grown lefs rapid, become a river; and many of thefe being united in one common channel, make fuch ftreams as the Rhine and the Danube; which latter, he obferves, one would hardly think to be a collection of water condenfed out of vapour, unlefs we confider how vaft a tract of ground that river drains, and that it is the fum of all thofe fprings which break out on the fouth fide of the Carpathian mountains, and on the north fide of the immenfe ridge of the Alps, which is one continued chain of mountains from Switzerland to the Black Sea.

Thus one part of the vapours which are blown on the land is returned by the rivers into the fea from whence it came. Another part falls into the fea before it reaches the land; and this is the reafon why the rivers do not return fo much water into the Mediterranean as is raifed in vapour. A third part falls on the low lands, where it affords nourifhment to plants; yet it does not reft there, but is again exhaled in vapour by the action of the fun, and is either carried by the winds to the fea to fall in rain or dew there, or elfe to the mountains to become the fources of fprings.

However, it is not to be fuppofed that all fountains are owing to one and the fame caufe; but that fome proceed from rain and melted

ſnow, which, ſubſiding through the ſurface of the earth, makes its way into certain cavities, and thence iſſues out in the form of ſprings; becauſe the waters of ſeveral are found to increaſe and diminiſh in proportion to the rain which falls: that others again, eſpecially ſuch as are ſalt, and ſpring near the ſea-ſhore, owe their origin to ſea-water percolated through the earth; and ſome to both theſe cauſes: though without doubt moſt of them, and eſpecially ſuch as ſpring near the tops of high mountains, receive their waters from vapours, as before explained.

This reaſoning of Dr. Halley's is confirmed by more recent obſervations and diſcoveries. It is now found, that, though water is a tolerable conductor of the electric fluid, dry earth is an electric *per ſe*, conſequently the dry land muſt always be in an electrified ſtate compared with the ocean. It is alſo well known, that ſuch bodies as are in an electrified ſtate, whether *plus* or *minus*, will attract vapour, or other light ſubſtances that come near them. Hence the vapours that are raiſed from the ocean muſt neceſſarily have a tendency to approach the land in great quantity, even without the aſſiſtance of the wind, though this laſt muſt undoubtedly contribute greatly towards the ſame purpoſe, as Dr. Halley juſtly obſerves. In like manner, the higher grounds are always in a more electrified ſtate than the lower ones: and hence the vapours, having once left the ocean and approached the ſhore, are attracted by the high mountains; of which Mr. Pennant gives an inſtance in Snowdon. Hence we may ſee the reaſon why ſprings are ſo common in the neighbourhood of mountains, they being ſo advantageouſly formed in every reſpect for collecting and condenſing the vapours into water.

The heat of ſprings is generally the ſame with the mean temperature of the atmoſphere. The mean temperature of the ſouth of England is 48°; in Scotland, near Edinburgh, it is 45°; in the north of Ireland it is 48°, and on the ſouth coaſt about 51°. At Upſal, in Sweden, it is 43°, and in Paris 53°. According to accurate experiments made by eminent philoſophers, the heat of the ſprings in theſe different countries correſponds with the medium temperature. We have not heard that ſimilar experiments have been made in other countries, or we ſhould have been careful to collect them. We do not, however, doubt but they have been made in moſt countries of Europe; yet we ſuſpect little attention has been paid to this ſubject within the tropical regions.

Though this coincidence of the heat of ſprings with the mean temperature of the climate where they flow, ſeems to be a general fact, yet it admits of many exceptions. In many parts of the world there are ſprings which not only exceed the mean temperature, but even the ſtrongeſt meridian heat ever known in the torrid regions. The following table will give a diſtinct notion of the degrees of heat which different ſprings have been found to poſſeſs, according to the experiments of philoſophers. It is neceſſary to remark, that experiments made upon the ſame ſprings, made by different perſons, vary a little from one another, which may be owing to many accidents eaſily accounted for. Where this is the caſe, we ſhall mention both the loweſt and higheſt degree of heat which has been aſcribed to the ſame ſpring, according to Fahrenheit's thermometer.

Springs.	Higheſt Deg. of Heat.	Loweſt.
Briſtol, (St. Vincent's, or the Hot-well,)	84	76
Buxton, (Gentleman's bath,)	82	
Matlock,	69	
Bath, (King's bath,)	119	113
Aix-la-Chapelle,	146	136
Barege,	122	
Piſa,	104	
Caroline Baths in Bohemia, (prudel, or furious,)	165	
Iceland, (Geyzer,)	212	

In cold countries, where congelation takes place, the heat of the earth is conſiderably above the freezing point, and continues ſo through the whole year. From experiments that have been made in mines and deep pits, it appears that this heat is uniform and ſtationary at a certain depth. But as the heat of theſe ſprings far exceeds the common heat of the internal parts of the earth, it muſt be occaſioned by cauſes peculiar to certain places; but what theſe cauſes are it is no eaſy matter to determine. We are certain, indeed, that hot ſprings receive their heat from ſome ſubterranean cauſe; but it is a matter of difficulty to inveſtigate how this heat is produced and preſerved. Theories, however, have been formed on this ſubject. The ſubterranean heat has been aſcribed to the electrical fluid, and to a great body of fire in the centre of the earth: but we ſuſpect that the nature of the electrical fluid and its effects are not ſufficiently underſtood. As to the ſuppoſition that the heat of ſprings is owing to a central fire, it is too hypothetical to require any refutation. From what then does this heat originate, and whence is the fuel which has produced it for ſo many ages? To enable us to anſwer theſe queſtions with preciſion, more information is neceſſary than we have hitherto obtained reſpecting the ſtructure of the internal parts of the earth. It is peculiarly requiſite that we ſhould be made acquainted with the foſſils which are moſt common in thoſe places where hot ſprings abound. We ſhould then perhaps diſcover that hot ſprings always paſs thro' bodies of a combuſtible nature. It is well known to chemiſts, that, when water is mixed with the vitriolic acid, a degree of heat is produced ſuperior to that of boiling water. It is alſo an eſtabliſhed fact, that when water meets with pyrites; that is, a mixture of ſulphur and iron, a violent inflammation takes place. If, therefore, we could prove that theſe materials exiſt in the ſtrata from which hot ſprings are derived, we ſhould be enabled to give a ſatisfactory account of this curious phenomenon. As ſome apology for this ſuppoſition, we may add, that moſt of the hot ſprings mentioned above have been found by analyſis to be impregnated with ſulphur, and ſome of them with iron. It muſt, however, be acknowledged, that the hot ſprings of Iceland, which are 112°, the heat of boiling water, according to an accurate analyſis of their contents by the ingenious Dr. Black, were neither found to contain iron nor ſulphur. It will therefore, perhaps, be neceſſary that we ſhould wait with patience, till the ſciences of chemiſtry and mineralogy ſhall be ſo far advanced as to enable us to form a permanent theory on this ſubject.

Springs are of different kinds. Some are perennial, or continue to flow during the whole year; others flow only during the rainy ſeaſon; ſome ebb and flow. At Torbay there is one of this kind,

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which ebbs and flows five or six inches every hour. There is another near Coriso in Italy, which ebbed and flowed three times a-day in the time of Pliny, and continues to do still. A spring near Henley sometimes flows for two years together, and then dries up for an equal period.

The following account of the wonderful faculty of the Houzuanas, a tribe of Hottentots, in discovering subterraneous springs, is extracted from the third volume of Le Vaillant's Travels into the interior of Africa, by the Cape of Good Hope:—

"When on a journey, a scarcity of water gives them (the Houzuanas) no uneasiness, even in the middle of a desert. By a particular art they can discover water that is concealed in the bowels of the earth; and their instinct, in this point, is even superior to that of the other Africans. Animals, in like cases, also find water; but it is only by the smell. There must be a current of air to convey to them the exhalation which rises from it; and consequently they must be to windward. Whilst I resided in the desert, during my first journey, the savages had shewn more than once the same faculty; and I myself acquired it also from their instruction, as I have mentioned in my narrative.

"The Houzuana, more expert, employs only his sight. He throws himself flat on the ground, takes a distant view, and, if the space which he traverses with his eye conceals any subterraneous spring, he rises and points with his finger to the spot where it is to be found. The only thing by which he discovers it is, that ethereal and subtile exhalation which evaporates from every current of water, when not sunk to too great a depth.

"With regard to pools and other collections, formed by the rain, as their evaporation is more sensible, they are discoverable, even when hid by an eminence or a hill; and the vapour of streams, being still more abundant, is so distinctly marked by it, that their course, and even all their sinuosities, may be traced.

"I endeavoured to learn this art of the Houzuanas, during the time I resided amongst them. I followed their example, and practised their lessons; and was at length able to make similar discoveries, and with as much certainty. My talent, however, was far from being so extensive as theirs; for, owing either to the natural weakness of my sight, or the want of experience, I could distinguish water at no greater distance than three hundred paces, when they could perceive it at a distance much more considerable."

MEMOIRS OF THE LATE Mr. JOSEPH WRIGHT, OF DERBY.

JOSEPH WRIGHT was born at Derby, on the 3d Sept. 1734, and was the son of a very respectable attorney there; he received his education at the free grammar school under the care of the Rev. Mr. Almond. During his youth he shewed a great fondness for all kinds of mechanical employments, spending most of his leisure hours in watching the operations of expert workmen, whose performances he frequently imitated. These occupations soon gave place to his affection for drawing, which soon shewed itself; and, having discovered considerable adroitness in taking likenesses very often of persons whom he had only once seen, his father was induced to comply with his earnest wishes, by looking out for a situation in London where he

he might have better opportunitics of making improvement.—Hudson was the most eminent portrait-painter of that day, and, in 1751, young Wright was placed with him for the term of two years, after which time he returned to Derby, and painted several portraits in that neighbourhood with tolerable success: not being satisfied with his own productions, he returned to London in 1756, and remained fifteen months longer with his old master Hudson for want of a more able preceptor, as he often lamented that it was not in his power to obtain better instructions than Hudson could furnish. It must not, however, be forgotten, that Sir Joshua Reynolds and Mortimer were likewise pupils of the same master, which affords a striking proof of the great abilities of this triumvirate, who could arrive at such eminence in their profession, in spite of the obstacles which at that period they had to combat with. After Mr. Wright's return from his second abode with Hudson, he painted many portraits in a very superior style; and, soon after the year 1760, he produced a set of historical pictures, which may deservedly rank amongst the earliest valuable productions of the modern school.—Of these the Blacksmith's Forge, Air Pump, Gladiator, and several others, are very well known by Pether's metzotintos. In 1773 he was married, and indulged his wish of visiting Italy, where he remained fully two years studying the works of the first masters, and more especially the inimitable productions of Michael Angelo, in the Capella Festina of the Vatican; of many parts of which he made faithful drawings, upon a larger scale than has generally been attempted, as he considered those subjects but ill adapted for pocket-book sketches. These treasures of art have hitherto remained, in a great degree, lost to the world, having scarcely been seen except by Mr. Wright's particular friends, to whom he shewed them, when his imagination was warmed with a description of the divine originals. In 1775, he returned to England, and resided two years at Bath, after which time his residence was entirely at Derby. Being frequently urged by his friends to fix in London, he had it often in contemplation to remove thither, but had never resolution to leave the place where his family had so long resided, and to which he was so much attached, that it daily became more difficult for him to resolve upon a removal, particularly as he dedicated the whole of his time to the study of his profession, so that, for many years past, (with the exception of a few particular friends,) he scarcely wished for any society beyond that of his own family. In 1793, he visited the lakes of Westmoreland and Cumberland, where he was so much pleased with the extraordinary effects he witnessed, that, notwithstanding his health was then much impaired, he made studies from which he has produced a few pictures still finer than any he had before painted; not contenting himself with giving mere portraits of the scenery, but imitating, with great success, those brilliant effects of light and shade which characterize our variable atmosphere. His health continued to decline, until at length, on the 29th of August, 1797, he paid the great debt of nature, which was to him a happy release from a tedious and painful illness.—In his person he was rather above the middle size, and, when young, was esteemed a very handsome man; his company was then much courted on account of his pleasing vivacity and convivial habits; his eyes were prominent and very expressive; in his manners he was mild, unassuming, modest to an extreme, generous and full of

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fenfibility, with the perfect carriage of a gentleman; honourable and punctual in all his tranfactions, he entertained the moft utter contempt for every thing like meannefs or illiberality; and his good heart felt but too poignantly for the mifconduct of others.—It may truly be obferved of him, that he ftedfaftly acted on the principle of always continuing to learn; from converfation, from examining pictures, and, above all, from the ftudy of nature, he was conftantly endeavouring to advance in the knowledge of his art; and to this habit, as wife as it was modeft, of confidering himfelf through life as a learner, no fmall fhare of his excellence may be afcribed. This difpofition was naturally attended with a candid readinefs to adopt, from the practice of other artifts, new modes of proceeding, when they appeared to him rational, and to make trial in ftudies on a fmall fcale, of fuch as feemed in a tolerable degree promifing. To the judgment of his friends, who had directed any fhare of attention to landfcape or other branches of his art, he was always ready to give, at the very leaft, the weight which it deferved, and was folicitous to draw forth their objections and doubts, in order to profit by them. He well knew how defective and poor the higheft efforts of art are, when compared with the grandeur and beauty of nature, and fhewed at once his modefty and judgment, by expreffing this fentiment in the ftrongeft language: Landfcape painters fometimes learn, from admiring pictures as imitations of nature, to admire nature merely as the imitation of a picture, and proportion their approbation of any particular fcene to the refemblance which they fancy they difcover between it and the works of fome favourite mafter; but from this profeffional prejudice Mr. Wright was entirely free, confidering nature as the beft of models. Simplicity and truth were the objects of his refearches, and it is much to be lamented that he could not be prevailed upon to commit his obfervations to writing, to which he was frequently urged by his friends, who knew the rock upon which his theory of the art was eftablifhed, where nothing occurs to alarm fober judgment, nor to require voluminous explanations, which ferve only to bewilder the underftanding. He daily followed that excellent advice of du Frefnoy, which we lament is in general but too much difregarded. We fhall conclude our account of Mr. Wright in his private capacity as a man, with obferving that he repeatedly evinced much liberality, by giving valuable pictures to individuals among his private friends, or to perfons to whom he thought himfelf obliged. In various inftances thefe gifts were *manifeftly* difinterefted; and they were always conferred in a very pleafing manner which declined rather than fought the expreffion of gratitude.

Amongft the principal of his early hiftorical pictures may be reckoned the Air Pump, Orrery, Academy, Hermit, Chemift, Blackfmith's Forge, and others, which were painted prior to his vifiting Italy; and, as the fubjects were interefting, they attracted, in a confiderable degree, the public attention, and ferved to eftablifh his reputation as an artift many years before the foundation of the Royal Academy. Immediately upon his return from Italy, he exhibited fome pictures of Mount Vefuvius, under different effects attending a memorable eruption which happened during his refidence at Naples; and, having likewife feen a magnificent difplay of fireworks from the caftle of St. Angelo on the election of the prefent pope, he produced a furprifing picture of that extraordinary fpectacle—

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thefe works, being far beyond what had hitherto been produced, procured him the higheft reputation in fire-light fubjects, in the painting of which he contrived an apparatus purpofely for illuminating the objects with artificial lights, whereby he was enabled to imitate the real tints of nature more accurately, than, perhaps any other painter in that line had hitherto done. In moonlight likewife his pictures are allowed to hold the higheft rank, and it cannot be deemed an exaggeration to affert, that they remain unrivalled; neither is it likely they will be exceeded, until fome fuperior artift, poffeffing a more refined tafte and correct judgment, will, like him, pafs his evenings in ftudying the curious and delicate hues of objects under the various circumftances attendant upon fcenes of this nature, which have by many painters been confidered as compofed merely of black and white, without attention to the numberlefs beautiful tints unnoticed by fuperficial obfervers, but which conftitute a principal excellence in Mr. Wright's works. His judicious combination of fire and moon-light has particularly attracted the admiration of connoiffeurs; but this excellence was the refult of that accuracy of difcrimination, which was Mr. Wright's great characteriftic, and which led him to treat every circumftance with precifion, contending that no part of a picture ought to be left imperfect, neither fhould a tint be introduced that was incongruous with the general harmony.

If the portraits, which he painted, fall fhort of the grandeur and brilliance of Sir Jofhua's beft works, they may juftly lay claim to the merit of truth and correctnefs, and of giving what he always aimed to arreft, the true character of nature. Had he refided in London, there can be little doubt he would have fhone in a very confpicuous point of view in this more profitable occupation; but, happily for the admirers of the higher branches of the art, he devoted his attention to other objects, and his portraits are moftly confined to the immediate neighbourhood of Derby; this remark may likewife, in a great degree, extend to the generality of his works, as but few of his late pictures have been publicly exhibited, owing to their being frequently difpofed of even before finifhed, and to a repugnance which he felt at fending his works to an exhibition, where he had too much caufe to complain of their being very improperly placed, and fometimes even upon the ground, that, if poffible, they might efcape the public eye. This narrow jealoufy, added to the circumftance of his being rejected as an R. A. at the time Mr. Garvey was a fuccefsful candidate, did not tend to increafe his opinion of the liberality of his brethren in the profeffion. The academy, however, being afterwards aware of the impropriety of thus infulting a man of his abilities, deputed their fecretary, Newton, to Derby, to folicit his acceptance of a diploma, which he indignantly rejected, knowing how little the inftitution could ferve him, and feeling, perhaps, a fatisfaction that his friend Mortimer and himfelf were both deemed equally unqualified to enjoy the honours attached to that royal eftablifhment. He was at an early period appointed a member of the fociety of artifts, to whofe exhibitions he contributed for many years.

The hiftorical pictures which he painted fince his return from Italy, have proved how equal he was to compofitions of that nature, and that, as a colourift, he may rank with the greateft mafters. The carnations in that admirable picture of the Dead Soldier, have fcarcely been exceeded in the Venetian fchool; and the anatomical correctnefs

correctneſs in the drawing of the figures, evinces how ſucceſsfully he had ſtudied that fundamental branch of the profeſſion. Two pictures of Hero and Leander, one being a calm and the other a ſtormy night ;—the ſtudent in Virgil's Tomb ;—Indian Widow and Lady in Comus ;—rank amongſt his greater works ; and, in ſeveral ſtudies of children, ſome playing with bladders, and others with lighted charcoal, he had opportunities of indulging his powers of producing extraordinary effects. A fine cavern by moon-light, in which he has introduced a large figure of Julia lamenting her baniſhment, in the poſſeſſion of D. Daulby, Eſq. has, by many connoiſſeurs, been conſidered as one of his beſt performances, and particularly by thoſe who admire the guſto of Michael Angelo, which is eminently diſplayed in that figure.

His ſtyle of landſcape painting is more varied, and conſiſts of a greater diverſity of ſubjects than that of any other artiſt whoſe works we are acquainted with. Sometimes he excites the ſublimeſt ideas by his wonderful repreſentations of ſtupendous caverns, under the various effects of day, fire, or moon-light ; at other times we are ſoothed with the calm and ſtill ſcenery of Italy, in which he introduces the clear and brilliant ſkies peculiar to that climate ; he again, in his laſt pictures, exhibits the moſt playful execution, and charming effects, which conſtitute the principal beauty of our own mountain ſcenery in Weſtmoreland and Cumberland. Upon theſe ſubjects his pencil was laſt employed, and, as a proof that his unremitting application was productive of farther advances towards perfection, his laſt work (not entirely finiſhed) being a view of the Head of Ulſwater Lake, from Lyulph's Tower, may juſtly be conſidered as the fineſt of all his landſcapes, and a work which alone would place his reputation along with that of the moſt eminent maſters.

His principal fire lights are a large Veſuvius, ſold to the Empreſs of Ruſſia for three hundred guineas ; a girandolo, its companion, in the ſame collection ; the deſtruction of the floating batteries off Gibraltar, in the poſſeſſion of J. Milnes, Eſq. of Wakefield, and other ſubjects, for many of which he received conſiderable prices.

In addition to the character which he merits for the executive part of his art, it is pleaſing to record, that in his works the attention is ever directed to the cauſe of virtue ; that his early hiſtorical pictures conſiſt of ſubjects either of rational or moral improvement, and he has ſucceeded admirably in arreſting the gentler feelings of humanity; for what eye or heart ever remained unmoved at the ſight of Maria, Sterne's Captive, or the Dead Soldier. In his works " not one immoral, one corrupted thought," occurs to wound the eye of delicacy, or induce a wiſh that ſo exquiſite a pencil had not found employment on more worthy ſubjects.

His pictures may be conſidered as the reflection of his own delicate mind, and will be ranked by poſterity as treaſures worthy the imitation of ſucceeding generations.

HISTORY OF LEARNING, AND TASTE, IN GREAT BRITAIN, DURING THE USURPATION OF CROMWELL.

IT has frequently been remarked, that, in periods of public commotion and of civil anarchy, the nobleſt energies of the human mind are often called forth to action ; and, if we have to witneſs much

much calamity, vice, and horror, the profpect is fomewhat cheered by examples of virtue uncontaminated by intereft, and of genius unfettered by timidity. Yet the fhort fpace of time which elapfed from the depofition of the firft Charles to the acceffion of his fon, prefents us with not many names of eminence in literature which were unnoticed in the preceding period. There was certainly a large mafs of learning depofited at this time in various hands; but that learning was obfcured by pedantry; and the fcience as well as the morals of the age was perverted by fanaticifm. It was an age of projects, but thofe projects partook of all the wildnefs of anarchy; and hiftory and politics were debafed, as they too commonly are, by a devotion to party.

The rapid tranfition of the human mind from torpid ignorance to reftlefs fpeculation, from ftupidity to error, was, perhaps, never more ftrongly inftanced than in thofe ages which immediately fucceeded the Reformation.

A blind devotion to the papal decrees, an averfion to inquiry, an indifference to knowledge and to tafte, characterized fucceffive ages and generations, of which fcarcely a monument remains, except upon the tables of chronology. An accidental difcovery, the invention of printing, feems to have awakened the European world from its mental lethargy; and no fooner was religious liberty reftored, and the fcriptures refcued from the ftrong and fterile grafp of the papal hierarchy, than a fcene of confufion enfued—every man heard them in his own tongue; or, more properly, he forced them to fpeak a language congenial to the caprices of his own imagination.

The ardour for theological fpeculation was fomewhat repreffed, as we have already feen, by the arbitrary interference of government during the reigns of Elizabeth and her immediate fucceffor. But thefe impediments were no fooner removed by the downfall of Charles, and the fevere, though not wholly unmerited, punifhment of Laud, than the utmoft latitude was given to the excurfions of the imagination; and there was fcarcely a doctrine or text of fcripture which could be perverted, that did not ferve as the foundation on which fome clafs of enthufiafts erected a new form of religion. The difciples of Calvin were divided into various parties; many of them embraced with avidity the tenets of the anabaptifts, and a ftill larger party of the old puritans difcovered that even the prefbyterian church was not fufficiently democratical; that the church of Corinth had a complete independent jurifdiction within itfelf; and they determined, in confequence, that every particular and diftinct congregation of Chriftians muft have a full power to regulate all its own concerns without the aid of either bifhops or fynods, and independent of all connexion with other churches. This party, from their particular tenets, were termed Independents; and with this party it was, that the artful and ambitious Cromwell thought proper to connect himfelf. Where there exifts no regular principle of affociation, no connected government or fubordination in any fociety, that fociety, whether civil or religious, will more readily be reduced under the yoke of flavery. The prefbyterian party under Cromwell, therefore, loft all its weight and importance in the ftate; fome of its members were fubjected to the feverity of perfecution; the independents, of all the greater fects, were alone admitted to the favour of the pro-

tector, while ſome of the weaker and leaſt numerous of the other ſects enjoyed perfect toleration, if not protection, from the court.

It is difficult to ſtop the progreſs of innovation, and it is moſt difficult in religious ſpeculation. The independents themſelves divided, after ſome time, into a number of ſubordinate ſects; and ſome of them, by interpreting the obſcure parts of ſcripture in a literal ſenſe, embraced and propagated the wildeſt doctrines, and the moſt abſurd delutions. The Ranters received their name from the violence of their extemporaneous harangues, and from their ridiculous and unnatural geſticulation. The Antinomians, not content with rejecting entirely the Jewiſh diſpenſation, and cancelling even the moral precepts of the law, extended the doctrine of juſtification by the death of Chriſt to an unwarrantable extreme; and aſſerted that juſtification precedes the birth of the individual, and that it is impoſſible that by any part of his conduct he can become obnoxious to future puniſhment. The fifth-monarchy-men, exulting in the overthrow of temporal ſovereignty, applied the prophecies which relate to the advent of Chriſt in their literal ſenſe; they aſſerted that this was the ſeaſon indicated by the prophets, in which Chriſt was to reign with his elect upon earth; ſome of them even aſſumed the prophetic character, proclaimed themſelves the precurſors of the Lord, and pronounced poſitively the ſpeedy downfall of all other principalities and powers.

Among the numerous pretenders to the gift of prophecy, few were more ſucceſsful than the celebrated Lodewick Muggleton, who, from the humble ſtation of a journeyman taylor, was ſuddenly exalted into the founder of a ſect. His aſſociate was a perſon of the name of Reeves, who was perfectly on a level with him both as to ſtation and erudition. They exhibited themſelves as the two laſt witneſſes of God; they aſſumed an abſolute power of diſpenſing damnation or ſalvation to mankind; and preached that the end of the world was at hand. From the nature of their tenets, however, their popularity was but of ſhort duration. The diſappointment of a prediction is generally fatal to the reputation of the prophet:—their credit, therefore, ſurvived them but a few years; and we believe the ſect is now nearly, if not utterly, extinct.

Moſt of theſe viſionaries had their advocates. But few of the productions which contain their literary hiſtory have deſcended to poſterity; and theſe are only depoſited in the libraries of eccleſiaſtican antiquarians. They indeed truſted more in general for the propagation of their doctrines to the force of their extempore eloquence, than to the excellence of their compoſitions. Enthuſiaſm is an active principle, and but ſeldom ſubmits to the patient drudgery of literary labour.

While a ſtrict regard to truth obliges us to aſcribe the origin of the Quaker profeſſion to a ſpirit of enthuſiaſm in its firſt preachers, yet we muſt acknowledge that religious enthuſiaſm has never appeared in a more amiable form, nor was ever blended with purer and more refined principles of morality. George Fox, the famous founder of this reſpectable ſect, was born at Drayton, in Leiceſterſhire, and exerciſed the humble occupation of a ſhoemaker for a conſiderable time in the town of Nottingham. He is repreſented to have been of a penſive and retired temper; and, as ſober manners in that claſs of life are commonly connected with a devotional ſpirit, his leiſure

leifure hours were fpent in the affiduous ftudy of the fcriptures. He at length publicly proclaimed himfelf to be an infpired preacher; and the fimplicity of his manners, the purity of his life, the general utility and excellence of his precepts, and his adroitnefs in defending his tenets upon the principles of fcripture, foon attracted a number of difciples.

He declaimed with vehemence and with energy againft the vices of the age.—He condemned war, and proved it inconteftably to be altogether inconfiftent with the Chriftian profeffion. Oaths, upon every occafion, he regarded as a fpecies of blafphemy.—He ftrenuoufly recommended fimplicity in drefs, and frugality in all domeftic arrangements. The perfecutions which this good man, this truly apoftolical preacher, endured in his endeavours to reform a corrupt yet bigoted age, are a ftigma on the times in which he lived, and a difgrace to profeffing Chriftians. The ufurper Cromwell himfelf felt the force of his rebukes; and his military defpotifm tottered before the preacher of peace. His foldiers themfelves were unable to refift that reafoning which proved from the gofpel the unlawfulnefs of their profeffion; and the fatellites of tyranny became the apoftles of peace, and the martyrs of religion. Not only many of the converts of Fox, therefore, were feverely punifhed, but he himfelf was fubjected to a rigorous imprifonment by the orders of government; and the reft of the Quaker preachers were enjoined filence under fevere penalties:—but what human authority can filence or counteract the force of truth?

Among the military converts of Fox, one of the moft extraordinary was James Naylor, who had been bred a farmer, but who, during the civil wars, had enlifted as a foldier in the parliamentary army. Naylor foon became a preacher among the new fect; and his zeal was not unaccompanied by talents. But the modefty and fimplicity which characterized the Quakers in general, were, in the violence of enthufiafm, or in the career of vanity, forgotten by Naylor. Not content with affuming the prophetic character, it is faid he arrogated to himfelf titles which approached to blafphemy, and difgraced religion by the extravagancies which he committed. His followers participated in his zeal and his infanity; and (if we may credit contemporary writers) as he paffed through Briftol in his way to London from the weft, the multitude who accompanied him, proclaimed him as the promifed Meffiah, and, in imitation of our Saviour's entry into Jerufalem, fung, as they marched before him, the facred hymn—"Holy, holy, holy, Lord God of Sabaoth—Hofannah in the higheft," &c. So grofs a mockery of religion was not to be endured by fanaticifm itfelf. The pretended prophet was apprehended by the magiftrates, and fent to London to be examined by the parliament. The parliament, in this inftance, departed from their functions as legiflators, and affumed the complex character of judges, jury, and accufers. The fentence was as fevere as it was probably unjuft; and the irregularity of the proceedings leads us to fufpect the truth of the evidence on which he was faid to be convicted. Either his fufferings reftored him to his right fenfes, or (what we are difpofed to believe) his errors had been grofsly exaggerated and mifreprefented. In his confinement he compofed feveral tracts in a ftrain of piety, bordering indeed on enthufiafm, but in a fpirit of humility inconfiftent with the charges of blafphemy alleged

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against him. The writings of the Quakers in general were, however, at this period but little noticed without the narrow boundaries of their own sect. In the succeeding reign the tenets of the society were acutely defended by the learning and talents of a Barclay; and their constitution was organized and digested by the judgment of a Penn.

The Socinian doctrines, which had been published in Poland in the latter end of the preceding century, had at this period made but little progress in Great Britain; yet the doctrine of the Trinity was vigorously impugned by John Biddle, a student of Magdalen-hall, Oxford, and master of the free-school of Crypt, in the city of Gloucester, who suffered a long and rigorous imprisonment from the Calvinistic party in the long parliament, and was at length tried for his life on the infamous ordinance of blasphemy, which was passed by that body, and was rescued from the fatal effects of this prosecution only by the interference of Cromwell. It does not appear that Biddle was conversant with the writings of the Polish brethren; and his objections to the received doctrine of the Trinity were chiefly confined to the divinity of the Holy Ghost. He was committed to prison along with other dissenters after the restoration, where he soon contracted a disease, of which he died.

The more powerful and numerous sects, those which at different periods of this fluctuating government enjoyed the favour and protection of the legislature and the court, it may well be imagined, included among their partizans several men of great and eminent talents. Among presbyterians there are none whose names have descended to posterity with a reputation equal to that of Matthew Poole and Edmund Calamy. Mr. Poole was, however, only known, at the period of which we are now treating, as the author of some useful tracts, and as a man of considerable erudition. His great work, the Synopsis Criticorum Bibliorum, was not undertaken till the succeeding reign, after his ejection from the church of St. Michael-le-Quern, of which he was rector upwards of twelve years. Edmund Calamy was, as well as Matthew Poole, educated at Cambridge; and, in the year 1739, was chosen by the parishioners minister of St. Mary, Aldermanbury. Very early in life he evinced strongly his antipathy to the Arminian party; and this circumstance, it is alleged, prevented his obtaining a fellowship in the university, though his literary acquirements and his standing both entitled him to it, and though his character was unblemished. Mr. Calamy commenced his ecclesiastical career as a conformist to the church of England, and is said rather to have objected to the forms under which episcopacy was established in this country, than to episcopacy itself. Though he occasionally preached before the house of commons during the interregnum, yet he took no part in the violent proceedings of the republican party, and opposed the beheading of the king with constancy and courage. During the usurpation of Cromwell, he was passive; yet when called upon to declare his sentiments, he was far from approving that proceeding. There is indeed a remarkable story of this person related by Harry Neville, one of the council of state, which is deserving the notice of all posterity, since it conveys to the reflecting reader the real secret of every tyrannical government, and the means by which the liberties of mankind are wrested from them. When Cromwell first aspired to the supreme dignity, desirous of the support of the presbyterian clergy, he sent for some of the most eminent

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of the city divines, informing them that, as a matter of conſcience, he would ſubmit his arguments and his ſcruples to their determination. Among thoſe who attended, was Mr. Calamy; and he oppoſed the project of Cromwell's ſingle government with equal boldneſs and force, and endeavoured to prove it not only unlawful but impracticable, aſſerting that it was evidently againſt the ſenſe of the nation, and that nine out of ten would openly oppoſe it. "Well," replied Cromwell, "if that is all, ſuppoſe I ſhould diſarm the nine, and put the ſword into the tenth man's hand, will not that, think you, effect the buſineſs?"

Mr. Calamy was one of the non-conformiſt divines who were principally concerned in writing the famous book known by the name Smectymnuus, which, in the year 1641, gave, as he himſelf expreſſes it, "the firſt mortal blow to epiſcopacy." It is entitled, An Anſwer to a Book entitled, An humble Remonſtrance; in which the Original of Liturgy and Epiſcopacy is diſcuſſed, &c. written by Smectymnuus, a word compoſed of the initial letters of its authors' names, viz. Stephen Marſhal, Edmund Calamy, Thomas Young, Matthew Newcomen, and William Spurſtow, all of them men of note and reputation among the non-conformiſts. Dr. Joſeph Hall, biſhop of Exeter, was the author of the Humble Remonſtrance; and a controverſy of ſome length was carried on between him and the Smectymneans. But the worthy and pious prelate was ſcarcely equal to a conteſt with ſuch acute and able antagoniſts, whatever advantage he might have in point of evidence and fact. Though Mr. Calamy was at firſt rewarded for his loyalty by being appointed chaplain in ordinary to Charles II. he ſoon experienced the ingratitude which was ſo peculiarly the characteriſtic of that prince, and was ejected from his living, and even committed to priſon, on ſome trifling accuſation. The learned and pious Baxter was alſo at this period in ſome repute among the preſbyterians; but, as his literary labours were chiefly confined to the ſucceeding period, we muſt reſerve his character for another opportunity.

ACCOUNT OF THE NATIVE GOLD LATELY DISCOVERED IN IRELAND.

[In a Letter from ABRAHAM MILLS, Eſq. to Sir JOSEPH BANKS, Bart.]

THE extraordinary circumſtance of native gold being found in this vicinity, early excited my attention, and led me to ſeize the firſt opportunity that preſented itſelf, after my late arrival here, to inſpect the place where the diſcovery was made. I went thither with Mr. Lloyd, of Havodynos, and Mr. Weaver. The former having given you ſome account of the circumſtances which attended the original diſcovery, and, ſince he left me, a favourable day having enabled me to take a ſecond view of the adjacent country, I ſhall now attempt to deſcribe the general appearance, and add ſuch farther information as has come to my knowledge.

The workings which the peaſantry recently undertook are on the north-eaſt ſide of the mountain Croughan Kinſhelly, within the barony of Arklow, and county of Wicklow, on the lands of the Earl of Carysfort, wherein the Earl of Ormond claims a right to the minerals,

nerals, in consequence (as I have been informed) of a grant in the reign of King Henry II. by Prince John, during his command of his father's forces in Ireland; which grant was renewed and confirmed by Queen Elizabeth, and again by King Charles II. The summit of the mountain is the boundary between the counties of Wicklow and Wexford; seven English miles west from Arklow, ten to the south-westward of Rathdrum, and six south-westerly from Cronebane mines; by estimation about six hundred yards above the level of the sea. It extends W. by N. and E. by S. and stretches away to the north-eastward, to Ballycoage, where shafts have formerly been sunk, and some copper and magnetic iron ore has been found; and thence to the N. E. there extends a tract of mineral country, eight miles in length, running through the lands of Ballymurtage, Ballygahan, Tigrony, Cronebane, Connery, and Kilmacoc, in all which veins of copper ore are found, and terminating at the slate quarry at Balnabarny.

On the highest part of the mountain are bare rocks, being a variety of argillite, whose joints range N. N. E. and S. S. W. hade to the S. S. W. and in one part include a rib of quartz, three inches wide, which follows the direction of the strata. Around the rocks, for some distance, is sound ground, covered with heath; descending to the eastward, there is springy ground, abounding with coarse grass; and below that a very extensive bog, in which the turf is from four to nine feet thick, and beneath it, in the substratum of clay, are many angular fragments of quartz, containing chlorite, and ferruginous earth. Below the turbary the ground falls with a quick descent, and three ravines are observed. The central one, which is the most considerable, has been worn by torrents, which derive their source from the bog; the others are formed lower down the mountain by springs, which uniting with the former, below their junction the gold has been found. The smaller have not water sufficient to wash away the incumbent cay, so as to lay bare the substratum; and their beds only contain gravel, consisting of quartz with chlorite, and other substances of which the mountain consists. The great ravine presents a more interesting aspect; the water in its descent has, in a very short distance from the bog, entirely carried off the clay, and considerably worn down the substrata of rock, which it has laid open to inspection.

Descending along the bed of the great ravine, whose general course is to the eastward, a yellow argillaceous shistus is first seen; the laminæ are much shattered, are very thin, have a light hade to the S. S. W. and range E. S. E. and W. N. W. Included within the shist, is a vein of compact barren quartz, about three feet wide, ranging N. E. and S. W. below this is another vein, about nine inches wide, having the same range as the former, and hading to the northward, consisting of quartz, including ferruginous earth. Lower down, is a vein of a compact aggregate substance, apparently compounded of quartz, ochraceous earth, chert, minute particles of mica, and some little argillite, of unknown breadth, ranging E. and W. hading fast to the southward, and including strings of quartz, from one to two inches thick, the quartz containing ferruginous earth. The yellow argillaceous shistus is again seen with its former hade and range: and then, adjacent to a quartz vein, is laminated blue argillaceous shistus, ranging N. E. and S. W. and hading S. E.

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which is afterwards ſeen varying its range and hade, running E. N. E. and W. S. W. and hading N. N. W. lower down, the blue ſhiſt is obſerved more compact, though ſtill laminated. The ground, leſs ſteep, becomes ſpringy, is incloſed, and the ravine, ſhallower, has depoſited a conſiderable quantity of clay, ſand, and gravel. Following the courſe of the ravine, or, as it may now more properly be called, the brook, arrive at the road which leads to Arklow; here is a ford, and the brook has the Iriſh name of *Aughatinavought*, (the river that drowned the old man;) hence it deſcends to the Aughriin river juſt above its confluence with that from Rathdrum, which, after their junction, take the general name of the Ovo, that, diſcharging itſelf into the ſea near the town of Arklow, forms an harbour for veſſels of ſmall burthen.

The lands of Ballinvally are to the ſouthward, and the lands of Ballinagore to the northward, of the ford, where the blue ſhiſtus rock, whoſe joints are nearly vertical, is ſeen ranging E. N. E. and W. S. W. including ſmall ſtrings of quartz, which contain ferruginous earth. The ſame kind of earth is alſo ſeen in the quartz, contained in a vein from ten to twelve inches wide, ranging E. N. E. and W. S. W. and hading to the ſouthward, which has been laid open in forming the Arklow road.

Here the valley is from twenty to thirty yards in width, and is covered with ſubſtances waſhed down from the mountain, which on the ſides have accumulated to the depth of about twelve feet. A thin ſtratum of vegetable ſoil lies uppermoſt; then clay, mingled with fine ſand, compoſed of ſmall particles of quartz, mica, and ſhiſt; beneath which the ſame ſubſtances are larger, and conſtitute a bed of gravel, that alſo contains nodules of fine grained iron ſtone, which produces fifty per cent. of crude iron: incumbent on the rock, are large tumblers of quartz, a variety of argillite and ſhiſtus; many pieces of the quartz are perfectly pure, others are attached to the ſhiſtus, contain chlorite, pyrites, mica, and ferruginous earth; and the arſenical cubical pyrites frequently occurs, imbedded in the blue ſhiſtus. In this maſs of matter, before the workings began, the brook had formed its channel down to the ſurface of the rock, and between ſix and ſeven feet wide, but in times of floods extended itſelf entirely over the valley.

Reſearches have been made for the gold, amidſt the ſand and gravel along the run of the brook for near half a mile in length; but it is only about one hundred and fifty yards above, and about two hundred yards below, the ford, that the trials have been attended with much ſucceſs: within that ſpace, the valley is tolerably level, and the banks of the brook have not more than five feet of ſand and gravel above the rock; added to this, it takes a ſmall turn to the ſouthward, and conſequently, the rude ſurfaces of the ſhiſtus rock in ſome degree croſs its courſe, and form natural impediments to the particles of gold being carried farther down the ſtream, which ſtill lower has a more rapid deſcent; beſides, the rude manner in which the country people worked, ſeldom enabled them to penetrate to the rock, in thoſe places where the ſand and gravel were of any material depth. Their method was, to turn the courſe of the water wherever they deemed neceſſary, and then, with any inſtruments they could procure, to dig holes down to the rock, and by waſhing, in bowls and ſieves, the ſand and gravel they threw out,

out, to ſeparate the particles of gold which it contained; and, from the ſlovenly and haſty way in which their operations were performed, much gold moſt probably eſcaped their ſearch; and that indeed actually appears to have been the caſe; for ſince the late rains waſhed the clay and gravel which had been thrown up, gold has been found lying on the ſurface. The ſituation of the place, and the conſtant command of water, do, however, very clearly point out the great facility with which the gold might be ſeparated from the traſh, by adopting the mode of working practiſed at the beſt managed tin ſtream works in the county of Cornwall; that is, entirely to remove (by machinery) the whole cove off the rock, and then waſh it in proper bundles and ſieves. And by thus continuing the operations, conſtantly advancing in the ravine towards the mountain, as long as gold ſhould be found, the vein that forms its matrix might probably be laid bare.

The diſcovery was made public, and the workings began, early in the month of September, and continued the 15th of October, when a party of the Kildare militia arrived, and took poſſeſſion by order of government; and the great concourſe of people, who were buſily engaged in endeavouring to procure a ſhare of the treaſure, immediately deſiſted from their labour, and peaceably retired.

Calculations have been made, that during the foregoing period, gold to the amount of three thouſand pounds Iriſh ſterling was ſold to various perſons; the average price was three pounds fifteen ſhillings per ounce; hence eight hundred ounces appear to have been collected within the ſhort ſpace of ſix weeks.

The gold is of a bright yellow colour, perfectly malleable; the ſpecific gravity of an apparently clean piece 19,000. A ſpecimen, aſſayed here by Mr. Weaver, in the moiſt way, produced from 24 grains, $22\frac{53}{101}$ grains of pure gold, and $1\frac{43}{101}$ of ſilver. Some of the gold is intimately blended with, and adherent to, quartz; ſome (it is ſaid) was found united to the fine grained iron ſtone, but the major part was entirely free from the matrix; every piece more or leſs rounded on the edges, of various weights, forms, and ſizes, from the moſt minute particle up to 2 oz. 17 dwts. only two pieces are known to have been found of ſuperior weight, and one of thoſe is five, and the other twenty-two, ounces.

I much regret not having been preſent when the work was going on, that I might have ſeen the gold as found, before prepared for ſale by breaking off any extraneous matter that adhered; for in that ſtate, a proper attention to the ſubſtances with which it was united, and a ſubſequent diligent inſpection of the ſeveral veins that range through the mountain, might aſſiſt towards the diſcovery of that from whence it was detached.

I ſhall ſhortly return to England; and on my arrival, will ſend ſpecimens of the gold, and of the different ſubſtances of the mountain, to be depoſited (if you think proper) in the collection of the Royal Society. And am, with great reſpect, &c.

ABRAHAM MILLS.

The bearings are all taken by the compaſs, without allowing for the variation. Beſides theſe accounts of the gold found in Ireland, the following information has been received on that ſubject:—William Moleſworth, Eſq. of Dublin, in a letter to Richard Moleſworth, Eſq. F. R. S. writes, that he weighed the largeſt piece of

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gold in his balance, both in air and water; that its weight was 26 oz. 2 dwts. 21 gr. and its ſpecific gravity, to that of ſterling gold, as 12 to 18. Alſo that Richard Kirwan, Eſq. F. R. S. found the ſpecific gravity of another ſpecimen to be as 13 to 18. Hence, as the gold was worth 4l. an ounce, Mr. William Moleſworth concludes, that the ſpecimens are full of pores and cavities, which increaſe their bulk, and that there are ſome extraneous ſubſtances, ſuch as dirt or clay, contained in thoſe cavities. This opinion was diſcovered to be well founded, by cutting through ſome of the ſmall lumps. Staneſby Alchorne, Eſq. his majeſty's aſſay-maſter at the Tower of London, aſſayed two ſpecimens of this native gold. The firſt appeared to contain, in 24 carats, $21\frac{6}{8}$ of fine gold; $1\frac{7}{8}$ of fine ſilver; $\frac{3}{8}$ of alloy, which ſeemed to be copper tinged with a little iron. The ſecond ſpecimen differed only in holding $21\frac{5}{8}$ inſtead of $21\frac{6}{8}$ of fine gold."

PYROTECHNY; OR THE ART OF PREPARING ALL KINDS OF FIRE-WORKS.—Continued from p. 92.

TO LOAD AIR-BALLOONS; with the Number of STARS, SERPENTS, SNAKES, RAIN-FALLS, &c. in Shells of each Nature.

Mortars to throw Aigrettes, &c.

WHEN you fill your ſhells, you muſt firſt put in the ſerpents, rains, ſtars, &c. or whatever they are compoſed of; then the blowing powder; but the ſhells muſt not be quite filled. All thoſe things muſt be put in at the fuze hole; but marrons, being too large to go in at the fuze hole, muſt be put in before the inſide ſhell be joined. When the ſhells are loaded, glue and drive in the fuzes very tight. For a cohorn balloon, let the diameter of the fuze hole be $\frac{2}{8}$ of an inch; for a royal balloon, which is near $5\frac{1}{2}$ inches diameter, make the fuze hole $1\frac{1}{6}$ inch diameter; for an 8 inch balloon, $1\frac{3}{8}$ inch; and for a 10-inch balloon, $1\frac{5}{8}$ inch.

Air-balloons are divided into 4 ſorts; viz. firſt, illuminated balloons; ſecond, balloons of ſerpents; third, balloons of reports, marrons, and crackers; and fourth, compound balloons. The number and quantities of each article for the different ſhells are as follow.

Cohorn Balloons illuminated.—Meal powder one ounce and a half; corn powder half an ounce; powder for the mortar, two ounces. Length of the fuze compoſition, $\frac{3}{4}$ of an inch; one ounce drove or rolled ſtars, as many as will nearly fill the ſhell.

Cohorn Balloon of Serpents.—Meal powder one ounce and a quarter; corn powder one ounce; powder for the mortar two ounces and a quarter. Length of the fuze compoſition $\frac{13}{10}$ of an inch: half-ounce caſes drove 3 diameters and bounced 3 diameters, and half-ounce caſes drove 2 diameters and bounced 4, of each an equal quantity, and as many of them as will fit in eaſily placed head to tail.

Cohorn Balloons of Crackers and Reports.—Meal powder one ounce and a quarter; corn powder, three quarters of an ounce; powder for the mortar two ounces. Length of the fuze compoſition $\frac{3}{4}$ of an inch. Reports 4, and crackers of 6 bounces as many as will fill the ſhell.

Compound Cohorn Balloons.—Meal powder one ounce and four drams; corn powder twelve drams; powder for the mortar two ounces and four drams. Length of the fuze compofition $\frac{13}{16}$ of an inch: $\frac{1}{2}$ ounce cafes drove $3\frac{1}{2}$ diameters and bounced 2, 16; $\frac{1}{2}$ ounce cafes drove four diameters and not bounced 10; blue ftrung ftars, 10; rolled ftars, as many as will complete the balloon.

Royal Balloons illuminated.—Meal powder one ounce and eight drams; corn powder twelve drams; powder for the mortar three ounces. Length of the fuze compofition $\frac{15}{16}$ of an inch; 2 ounce ftrung ftars, 34; rolled ftars, as many as the fhell will contain, allowing room for the fuze.

Royal Balloons of Serpents.—Meal powder one ounce; corn powder one ounce and eight drams; powder for the mortar three ounces and eight drams. Length of the fuze compofition 1 inch: 1 ounce-cafes drove $3\frac{1}{2}$ and 4 diameters, and bounced 2, of each an equal quantity, fufficient to load the fhell.

Royal Balloons with Crackers and Marrons.—Meal powder one ounce and eight drams; corn powder one ounce and four drams; powder for firing the mortar three ounces. Length of the fuze compofition $\frac{14}{16}$ of an inch; reports 12, and completed with crackers of 8 bounces.

Compound Royal Balloons.—Meal powder one ounce and five drams; corn powder one ounce and fix drams; powder for the mortar three ounces and twelve drams. Length of the fuze compofition 1 inch: $\frac{1}{2}$ ounce cafes drove and bounced 2 diameters, 8; 2 ounce cafes filled $\frac{5}{8}$ of an inch with ftar compofition, and bounced 2 diameters, 8; filver rain-falls, 10; 2-ounce tailed ftars, 16; rolled brilliant ftars, 30. If this fhould not be fufficient to load the fhell, you may complete it with gold rain-falls.

Eight-inch Balloons illuminated.—Meal powder two ounces and eight drams; corn powder one ounce and four drams; powder for the mortar nine ounces. Length of the fuze compofition 1 inch $\frac{1}{8}$: 2 ounce drove ftars, 48; 2 ounce cafes drove with ftar compofition $\frac{5}{8}$ of an inch, and bounced 3 diameters, 12; and the balloon completed with 2 ounce drove brilliant ftars.

Eight-inch Balloons of Serpents.—Meal powder two ounces; corn powder two ounces; powder for the mortar nine ounces and eight drams. Length of the fuze compofition 1 inch $\frac{3}{16}$: 2 ounce cafes drove $1\frac{1}{2}$ diameter and bounced 2, and 1 ounce cafes drove 2 diameters and bounced $2\frac{1}{2}$, of each an equal quantity fufficient for the fhell. The ftar-compofition driven in bounced cafes muft be managed thus: Firft, the cafes muft be pinched clofe at one end, then the corn-powder put in for a report, and the cafe pinched again clofe to the powder, only leaving a fmall vent for the ftar compofition, which is drove at top, to communicate to the powder at the bounce end.

Compound Eight-inch Balloons.—Meal powder two ounces and eight drams; corn powder one ounce and twelve drams; powder for the mortar nine ounces and four drams. Length of the fuze compofition $\frac{1}{8}$: 4 ounce cafes drove with ftar compofition $\frac{5}{8}$ of an inch, and bounced 3 diameters, 16; 2 ounce tailed ftars, 16; 2 ounce drove brilliant ftars, 12; filver rain-falls, 20; 1 ounce drove blue ftars, 20; and 1 ounce cafes drove and bounced 2 diameters, as many as will fill the fhell.

Another of eight Inches.—Meal powder two ounces and eight drams; corn powder one ounce and twelve drams; powder for the mortar

nine

nine ounces and four drams. Length of the fuze compofition 1 inch $\frac{1}{8}$: crackers of 6 reports, 10; gold rains, 14; 2 ounce cafes drove with ftar compofition $\frac{3}{8}$ of an inch, and bounced 2 diameters, 16; 2 ounce tailed ftars, 16; 2 ounce drove brilliant ftars, 12; filver rains, 10; 1 ounce drove blue ftars, 20; and 1 ounce cafes drove with a brilliant charge 2 diameters and bounced 3, as many as the fhell will hold.

A compound Ten-inch Balloon.—Meal powder three ounces and four drams; corn powder two ounces and eight drams; powder for the mortar twelve ounces and eight drams. Length of the fuze compofition $\frac{15}{16}$ of an inch: 1 ounce cafes drove and bounced 3 diameters, 16. Crackers of 8 reports, 12; 4 ounce cafes drove $\frac{1}{2}$ inch with ftar-compofition, and bounced 2 diameters, 14; 2 ounce cafes drove with brilliant fire $1\frac{1}{4}$ diameter, and bounced 2 diameters, 16: 2 ounce drove brilliant ftars, 30: 2 ounce drove blue ftars, 3; gold rains, 20; filver rains, 20. After all thefe are put in, fill the remainder of the cafe with tailed and rolled ftars.

Ten-inch Balloons of three Charges.—Meal powder three ounces; corn powder three ounces and two drams; powder for the mortar thirteen ounces. Length of the fuze compofition 1 inch. The fhell muft be loaded with 2 ounce cafes, drove with ftar compofition $\frac{1}{4}$ of an inch, and on that 1 diameter of gold fire, then bounced 3 diameters; or with 2 ounce cafes firft filled 1 diameter with gold fire, then $\frac{1}{4}$ of an inch with ftar compofition, and on that $1\frac{1}{4}$ diameter of brilliant fire. Thefe cafes muft be well fecured at top of the charge, left they fhould take fire at both ends: but their necks muft be larger than the common proportion.

To make Balloon Fuzes.—Fuzes for air-balloons are fometimes turned out of dry beech, with a cup at top to hold the quick-match, but, if made with pafted paper, they will do as well: the diameter of the former for fuzes for cohorn balloons muft be $\frac{1}{2}$ an inch; for a royal fuze, $\frac{5}{8}$ of an inch; for an 8-inch fuze, $\frac{3}{4}$ of an inch; and for a 10-inch fuze, $\frac{7}{8}$ of an inch. Having rolled your cafes, pinch and tie them almoft clofe at one end; then drive them down, and let them dry. Before you begin to fill them, mark on the outfide of the cafe the length of the charge required, allowing for the thicknefs of the bottom; and, when you have rammed in the compofition, take two pieces of quick-match about 6 inches long, and lay one end of each on the charge, and then a little meal-powder, which ram down hard; the loofe ends of the match double up into the top of the fuze, and cover it with a paper cap to keep it dry. When you put the fhells in the mortars, uncap the fuzes, and pull out the loofe ends of the match, and let them hang on the fides of the balloons. The ufe of the match is, to receive the fire from the powder in the chamber of the mortar, in order to light the fuze: the fhell being put in the mortar with the fuze uppermoft, and exactly in the centre, fprinkle over it a little meal-powder, and it will be ready to be fired. Fuzes made of wood muft be longer than thofe of paper, and not bored quite through, but left folid about $\frac{1}{2}$ an inch at bottom; and, when you ufe them, faw them off to a proper length, meafuring the charge from the cup at top.

Tourbillons.—Having filled fome cafes within about $1\frac{1}{2}$ diameter, drive in a ladleful of clay; then pinch their ends clofe, and drive them down with a mallet. When done, find the centre of gravity of

of each case; where you nail and tie a ſtick, which ſhould be ½ an inch broad at the middle, and run a little narrower to the ends: theſe ſticks muſt have their ends turned upwards, ſo that the caſes may turn horizontally on their centres: at the oppoſite ſides of the caſes, at each end, bore a hole cloſe to the clay with a gimblet, the ſize of the neck of a common caſe of the ſame nature; from theſe holes draw a line round the caſe, and at the under part of the caſe bore a hole with the ſame gimblet, within ½ diameter of each line towards the centre; then from one hole to the other draw a right line, and bore two holes; then from theſe holes to the other two lead a quick-match, over which paſte a thin paper. When you fire tourbillons, lay them on a ſmooth table, with their ſticks downwards, and burn the leader through the middle with a port-fire. They ſhould ſpin three or four ſeconds on the table before they riſe, which is about the time the compoſition will be burning from the ſide-holes to thoſe at bottom. To tourbillons may be fixed reports in this manner:—In the centre of the caſe at top make a ſmall hole, and in the middle of the report make another; then place them together, and tie on the report, and with a ſingle paper ſecure it from fire: this done, your tourbillon is completed. By this method you may fix on tourbillons ſmall cones of ſtars, rains, &c. but be careful not to load them too much. One-eighth of an inch will be enough for the thickneſs of the ſticks, and their length equal to that of the caſes.

To make Mortars to throw Aigrettes, and to load and fire them.—Mortars to throw aigrettes are generally made of paſteboard, of the ſame thickneſs as balloon mortars, and 2½ diameters long in the inſide from the top of the foot: the foot muſt be made of elm without a chamber, but flat at top, and in the ſame proportion as thoſe for balloon mortars; theſe mortars muſt alſo be bound round with a cord as before-mentioned: ſometimes eight or nine of theſe mortars, of about three or four inches diameter, are bound all together, ſo as to appear but one: but, when they are made for this purpoſe, the bottom of the foot muſt be of the ſame diameter as the mortars, and only ½ diameter high. Your mortars being bound well together, fix them on a heavy ſolid block of wood. To load theſe mortars, firſt put on the inſide bottom of each a piece of paper, and on it ſpread 1½ oz. of meal and corn powder mixed; then tie your ſerpents up in parcels with quick-match, and put them in the mortar with their mouths downwards; but take care the parcels do not fit too tight in the mortars, and that all the ſerpents have been well primed with powder wetted with ſpirit of wine. On the top of the ſerpents in each mortar lay ſome paper or tow; then carry a leader from one mortar to the other all round, and then from all the outſide mortars into that in the middle: theſe leaders muſt be put between the caſes and the ſides of the mortar, down to the powder at bottom: in the centre of the middle mortar fix a fire-pump, or brilliant fountain, which muſt be open at bottom, and long enough to project out of the mouth of the mortar; then paſte paper on the tops of all the mortars.

Mortars thus prepared are called a *neſt of ſerpents.* When you would fire theſe mortars, light the fire-pump, which when conſumed will communicate to all the mortars at once by means of the leaders. For mortars of 6, 8, or 10, inches diameter, the ſerpents ſhould be made

made in 1 and 2 ounce caſes, 6 or 7 inches long, and fired by a leader brought out of the mouth of the mortar, and turned down the outſide, and the end of it covered with paper, to prevent the ſparks of the other works from ſetting it on fire. For a ſix-inch mortar, let the quantity of powder for firing be 2 oz. for an 8-inch $2\frac{3}{4}$ oz. and for a 10-inch $3\frac{3}{4}$ oz. Care muſt be taken in theſe, as well as ſmall mortars, not to put the ſerpents in too tight, for fear of burſting the mortars. Theſe mortars may be loaded with ſtars, crackers, &c.

If the mortars, when loaded, are ſent to any diſtance, or liable to be much moved, the firing powder ſhould be ſecured from getting amongſt the ſerpents, which would endanger the mortars, as well as hurt their performance. To prevent which, load your mortars thus:—Firſt put in the firing powder, and ſpread it equally about; then cut a round piece of blue touch-paper, equal to the exterior diameter of the mortar, and draw on it a circle equal to the interior diameter of the mortar, and notch it all round as far as that circle; then paſte that part which is notched, and put it down the mortar cloſe to the powder, and ſtick the paſted edge to the mortar: this will keep the powder always ſmooth at bottom, ſo that it may be moved or carried anywhere without receiving damage. The large ſingle mortars are called *pots des aigrettes.*

Making, loading, and firing, of Pots des Brins.—Theſe are formed of paſteboard, and muſt be rolled pretty thick. They are uſually made three or four inches diameter, and four diameters long; and pinched with a neck at one end, like common caſes. A number of theſe are placed on a plank thus:—Having fixed on a plank two rows of wooden pegs; cut in the bottom of the plank a groove the whole length under each row of pegs; then, through the centre of each peg, bore a hole down to the groove at bottom, and on every peg fix and glue a pot, whoſe mouth muſt fit tight on the peg: through all the holes run a quick-match, one end of which muſt go into the pot, and the other into the groove, which muſt have a match laid in it from end to end, and covered with paper, ſo that when lighted at one end it may diſcharge the whole almoſt inſtantaneouſly: in all the pots put about 1 oz. of meal and corn powder; then in ſome put ſtars, and others rains, ſnakes, ſerpents, crackers, &c. when they are all loaded, paſte paper over their mouths. Two or three hundred of theſe pots being fired together make a very pretty ſhow, by affording ſo great a variety of fires.

Pots des Sauciſſons are generally fired out of large mortars without chambers, the ſame as thoſe for aigrettes, only ſomewhat ſtronger. Saucіſſons are made of 1 and 2 ounce caſes, 5 or 6 inches long, and choaked in the ſame manner as ſerpents. Half the number which the mortar contains muſt be drove $1\frac{1}{2}$ diameter with compoſition, and the other half two diameters, ſo that when fired they may give two volleys of reports. But if the mortars are very ſtrong, and will bear a ſufficient charge to throw the ſauciſſons very high, you may make three volleys of reports, by dividing the number of caſes into three parts, and making a difference in the height of the charge. After they are filled, pinch and tie them at top of the charge almoſt cloſe; only leaving a ſmall vent to communicate the fire to the upper part of the caſe, which muſt be filled with corn-powder very near the top; then pinch the end quite cloſe, and tie it: after this is done, bind the caſe very tight with waxed packthread, from the

choak at top of the compofition to the end of the cafe; this will make the cafe very ftrong in that part, and caufe the report to be very loud. Saucilfons fhould be rolled a little thicker of paper than the common proportion. When they are to be put in the mortar, they muft be primed in their mouths, and fired by a cafe of brilliant fire fixed in their centre. The charge for thefe mortars fhould be $\frac{1}{6}$th or $\frac{1}{5}$th more than for *pots des aigrettes* of the fame diameter.

SKETCHES OF TURKISH JURISPRUDENCE AND MANNERS.

THE adminiftration of juftice in Conftantinople is notorioufly corrupt. It is placed folely in the hands of the oulemah, or ecclefiaftical body, who are confirmed in their rapacity by being fecured from the interpofition of the body politic, as they receive no falary from the ftate. In thefe two caufes originates a fyftem of enormous peculation and bribery, fo that for the poor there is no redrefs. Turkifh jurifprudence profeffes the implicit direction of the korân, but more attention is paid to the multèkah, or fonhèt, containing the traditional injunctions; after all, the intereft or caprice of the judge biaffes the decifion.

The rank of Turkifh lawyers is the mufti, or deputy to the fultan; as kalife, or oracle of the law, the kadilefcars of Roumily and Anadoly; fupreme in their diftinct diftricts, mollahs, mufelims, and kadies. Thefe hold their mekemehs, or halls of juftice, where they try criminals and hear caufes, in which oral teftimony always prevails againft written evidence. Three MSS. of the Koran, the Evangelifts, and the Pentateuch, are kept by the kadies, who adminifter oaths upon them, according to the religion of the perfon to be fworn. Falfe witneffes are eafily procured; they frequent certain coffee-houfes, where thefe infamous tranfactions are arranged. If one of thefe wretches be too often detected, or has forfeited the interefted connivance of the judge, he is given over to the punifhment of the law. Mounted on an afs, with his arms and legs tied, and his face towards the tail, he is led through the ftreets and bazárs, where he is infulted with every groffnefs, and, if a Turk, fares very ill.

It is truly remarkable, in fo great a population, that criminal caufes do not occur more frequently. Murders are feldom heard of, and happen amongft the foldiers oftener than other defcriptions of people: they are certainly prevented by the prohibition of wearing arms in the capital. If the murderer efcape juftice for twenty-four hours, he is not amenable to the law: at leaft, has a good chance of evading its vengeance.—Robberies are not frequent, excepting in the great roads through diftant provinces, where they are always punifhed with impalement. There is no place of public execution; and, when a criminal is condemned, he is led down the neareft ftreet by the executioner, who is provided with a large nail and cord, which he places over the door of any fhop where he is not paid for forbearance. The body is raifed a few inches only above the ground, and muft be left untouched for three days. In inftances of decapitation, the more honourable punifhment, it is expofed as long in the ftreet, with the head under the arm, if a muffulman, but, if a rayah, between the legs. So horrid a fpectacle excites no emotion in the mind of a Turk; for it is certain that by no nation, be it as favage as it

it may, is the life of a man so lightly regarded as by them. This is a disgusting but true sketch of their laws and executive justice.

Personal combat, unknown to the ancients, but so universal in modern Europe since the days of Chibaley, is not practised amongst the Turks, nor is assassination, the disgrace of many nations, in any degree frequent. Connections with women, the great cause of inveterate quarrels, are so arranged as to render interference with each other almost impossible.—Before marriage they are not seen by their lovers, and after only by their husbands and near relatives. There is likewise an inviolable point of honour between men respecting their harems, and an avowed libertine would be banished from society.—Poison, secretly given, is the punishment he would probably incur.

To another occasion of personal provocation, they are equally strangers. Gaming is prohibited by the Mohammedan law; and, as chess is their favourite amusement, their singular proficiency is a proof that the love of gain may not be the only inducement to excel. Wagers, or anticipating the chances of any trial of skill or common event, they can consider as unlawful. To the absence of these powerful incitements to anger, and to their national suavity of manners as confined to themselves, may be attributed much social harmony, though with fewer examples of disinterested friendship than amongst us. The Turk shews insolence or moroseness to those only whom his prejudices exclude from intercourse.

The Rammezan, or Turkish Lent, lasts for one complete moon, and takes every month in the year in rotation. No institution can be more strictly or more generally observed; it enjoins perfect abstinence from sun-rise to sun-set, from every kind of aliment, even from water. Mohammed did not foresee that coffee and tobacco would become the chief luxury of his followers, and various were the opinions respecting the legality of taking them in Rammezan; which were finally determined in the negative. These are indeed days of penance to the labourer and mechanic, but to the opulent only a pleasant variety, for they sleep all day, and in the evening feast and make merry, as if they exulted in cheating the prophet. The only show of mortification is a prohibition from entering the harem during the twelve hours of fasting. Every night of this season is some appointed feast amongst the officers of the court.

Nor are the inferior orders deprived of their share of relaxation; for the shops of cooks and confectioners, and the coffee-houses, are unusually decorated and frequented. There are exhibitions of low humour, and the kara-guze, or puppet-show, represented by Chinese shades. For the graver sort, most coffee-houses retain a raccontatorè, or professed story-teller, who entertains a very attentive audience for many hours. They relate eastern tales, or sarcastic anecdotes of the times, and are sometimes engaged by government to treat on politics, and to reconcile the people to any recent measure of the sultan or vizier. Their manner is very animated, and their recitation accompanied by much gesticulation. They have the finesse, when they perceive the audience numerous, and deeply engaged, to defer the sequel of their story. The nightly illuminations of every minareh in the city, especially those of the imperial mosques, produce a very singular and splendid effect. Within each of these, the vast concaves of the domes are lighted up by some hundred

hundred lamps of coloured glafs; and external cords are thrown acrofs from one minareh to another, and the lamps fantaftically difpofed in letters and figures. I was not more agreeably furprifed by any thing I faw in Conftantinople, than the whole appearance of the firft night in Rammezan.

As an indulgence from the feverities of Lent, the Turks have their Beyrâm, and the Chriftians their Eafter. At this feafon, thofe of every nation appear in new clothes, and exhibit all poffible gaiety. Places of public refort are then particularly frequented, and the paftimes and groupes, excepting in their drefs, exactly refemble an Englifh wake.—The Turks are much delighted by a circular fwing, made by fixing a wheel on a high poft, from which hang many poles, with feats attached to them. I have feen feveral of thefe bearded children taking this amufement with great glee, and contrafted with the gravity of their habits, nothing could be more ridiculous. The Greeks have an univerfal licence, dance through the ftreets to very rude mufic, and are in the zenith of their vivacity; but the feftivity of the Armenians, a faturnine race, feems to confift chiefly in being intoxicated, and jumping with the prepofterous activity of an elephant. In the Campo de Morti, near Pera, fo called from being the cemetery of the Franks and Armenians, many of thefe droll fcenes may be then contemplated by an inveftigator of the precife traits of character which difcriminate the mafs of all nations.

The Turks have fumptuary laws, and habits peculiar to profeffions. By the turban differing in fize and fhape every man is known; and fo numerous are thefe diftinctions, that a dragoman, long converfant with Conftantinople, told me he knew not half of them. The emirs, real or pretended defcendants from the prophet, are diftinguifhed by the green muflin; the others wear white round a cap of cloth, and the head is univerfally very clofely fhaven. In the turbans of the oulemah there is a greater profufion of muflin, from ten to twenty yards, which are proportionally larger, as the wigs of profeffional men were formerly. The military, as the janiffaries, boftandjis, and topdjis, wear caps of the moft uncouth fhape and fafhion, fuch as defy defcription. The rayahs are known by a head-drefs called a kalpac, made of lamb-fkin, and inimitably ugly, differing entirely from a turban; and fometimes a famour, or black fur cap, which is principally worn by dragomen and phyficians. In other refpects they are dreffed as the Turks. Yellow flippers, or boots, are indulged only to thofe under ambaffadorial protection, and are an envied diftinction. When the prefent fultan came to the throne, he iffued an edict, that no unlicenfed rayah fhould appear publicly in yellow flippers.—At that time he took great pleafure in walking the ftreets in difguife; when meeting an ill-ftarred Jew dreffed contrary to law, he ordered his head to be inftantly ftruck off.—This was his firft act of feverity, which created moft unfavourable conjectures, not altogether confirmed by his fubfequent reign.

The Turks of better rank, and the regular citizens, wear what is called the long drefs, with outer robes of fine cloth, fhalloon, or pellices, which are in general ufe for the greater part of the year, and commonly of the moft coftly furs. They are feldom feen without a tefpi in their hands; it is a ftring of ninety-nine beads, correfponding with the names of the Deity, which they carry as much for

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amusement as devotion. Hamid Ali, a late vizier, wore one of pearl, so perfect as to be valued at 3000l. sterling.

The common people, especially those belonging to any military corps, have a jacket richly ornamented with gold or silver twist, trowsers of cloth, which close to the middle of the leg, the other part of which is bare, and red slippers. Their great pride is to stick into their girdle a pair of large horse pistols, a yataghân or long knife, a hanjiar or dagger, all profusely inlaid with silver in a grotesque taste, which, with pouches for ammunition and tobacco, are extremely incommodious, and several pounds weight. With these weapons they frequently do mischief, often from childishness, sometimes from intention. Such are seen in every town in the empire, except the capital, who glory in their privilege, as no rayah is permitted to carry arms.

By the laws of Islamism the Turks are forbidden vessels and utensils of gold or silver, and are directed to great simplicity in every habit of life. This injunction does not extend to women, whose pride consists in the number and costliness of their trinkets. The chief luxury of the men is displayed in the number of their attendants, and their horses with superb caparisons, often of embroidered velvet, and plates of silver embossed and gilt. No rich man appears in public but on horse back, with a train of footmen, in any part of Constantinople, the number of whom is unnecessarily great, and much of his income is expended in their daily maintenance, and new clothes at the feast of Bayrâm. Their wages are inconsiderable. No domestic performs more than one office; this serves the coffee, and that hands the napkin, but no emergency can command any other service.

The horses of the Arab, or Turcoman breed, are eminently beautiful, and are taught to prance under the perfect manège of the rider, however infirm. Great expence likewise is lavished on the boats, which are elegant in a high degree, carved, gilded, and lined with rich cushions. They cost from a hundred to a thousand piastres each. The rank of the owner is ascertained by the number of oars; and in dexterity or civility no watermen exceed the Turks.

Coaches are not in use, excepting that the clumsy non-descript vehicles, which convey the ladies of great harems, can be so called. In his pipe an opulent man is extremely sumptuous; the head must be of pale amber, the stick of jasmine-wood, with the bark preserved, and the bowl of a delicate red clay, manufactured at Burgas in Romelia, and highly ornamented. According to the dignity of the smoker is the length of his pipe, often six or seven feet, when it is carried by two of his servants from place to place with much ceremony; and the bowl is supported by wheels, as an aid to supreme indolence. In the summer, for greater coolness, the stem of the pipe is covered with cotton or muslin, and moistened with water. This sovereign recreation is not confined to the men; the ladies, especially those advanced in life, partake of it largely; and, as a delicacy, they mix the tobacco with frankincense, musk, or aloes wood. The sultan alone abstains from etiquette; as kalife, or representative of the prophet, he declines deciding, by his own practice, upon the propriety of any custom, about which the law is not specific and declaratory.

Notwithstanding their grave exterior, which might prepossess foreigners with an idea of concealing as much stupidity as sense, and apparently so ungenial with mirth or vivacity, the Turks, in superior life, of both sexes, indulge a vein of sarcastic humour, and are not behind more polished nations in the delicacy or severity of their repartees. Most gentlemen of the seraglio, or capital, have been educated in their seminaries of learning, and are conversant with oriental literature. Many of them quote the Persian poets as happily, and refer to the Arabic philosopers with as complete erudition, as we can do to the Greek or Roman. The "Leilat u alf leilah," or Arabian Nights, first introduced into Europe by Monsieur Petit de la Croix, are familiarly known by them, as well as the fables and allegories of Pilpay and Lokman, from which sources they store their minds as well with sentiments as expression.—To excel in colloquial facility and elegance, is the first ambition of every cheliby, or man of breeding.

I repeat a specimen of Turkish wit, related to me as having been occasioned by a recent circumstance :—A man of rank, remarkably unpleasing in his countenance and figure, was married, according to custom, without having first seen her unveiled, to a lady, whose pretensions to personal attractions did not exceed his own. On the morning after their marriage she demanded of him to whom of his friends she might shew her face with freedom. "Shew it," said he, "to all the world, but hide it from me." "Patience," rejoined the lady. "I have none," returned the bridegroom. "Ah!" said she, "I think you must have had a good share, for you have carried that abominable great nose about with you all your life-time."

PARTICULARS OF THE EXPENCE OF THE ROYAL HOUSEHOLD IN THE REIGNS OF HENRY VII. HENRY VIII. QUEEN ELIZABETH, &c.

If we compare the expences of the royal household in former times with those of later dates, and observe the alteration of the value of money, and the progressive rise in the cost of provisions, the result will probably be, that the expence of his present majesty's household is not more than it was in the time of Queen Elizabeth, and is much less than it was in the time of her successor.

The articles contained in the very curious wardrobe-account of Edward II. published by the Society, seem rather to relate to his extraordinary expences and preparations for war in Scotland, than to what we should properly call the expences of the household. The amount of the latter is, however, to be collected from the conclusion of the account, which, after stating the whole expences of

	£	s.	d.
the articles in that book to be - -	£.53,178	15	1
adds, Summa totalis exituum et expensarum garderobe per istum librum de anno 28, *una cum expensis hospicii regis ejusdem anni* - -	64,105	0	5
Deduct then the above sum - -	53,178	15	1
And the household expences will be - -	10,926	5	4

What

What might be the expence of Richard II. I do not know; but, according to Holinſhed, it muſt have been enormous, as he ſays there were three hundred ſervitors in the kitchen, and every other office furniſhed at the like rate, and that ten thouſand perſons had meat and drink allowed them.

From the pipe rolls it appears that the greateſt expence of Henry VII. was about 15,000l. per ann. but this was afterwards leſſened, and towards the end of his reign was reduced to about 13,000l.

Henry VIII. a prince fond of expence, began with about 16,000l. per ann. and went on increaſing till in his 30th year the expence was 22,000l. in the 33d year it got up to 34,000l. and the 37th to 40,000l.

In the beginning of Queen Elizabeth's reign, ſhe reduced her expence a little below what her father ended with, but, at the concluſion of her long reign, it was increaſed to 55,000l.

A little before her death ſhe was very uneaſy at finding her houſehold expences run ſo high, and the following account of a converſation which ſhe had on the ſubject with Mr. Brown, one of the officers of her green-cloth, is truly characteriſtic of her. She died ſhortly after, and before any thing had been done to correct the abuſes complained of.

The original of this paper is amongſt ſome that were collected by Sir Julius Cæſar. It is indorſed,

"The late Q. Majeſtes ſpetches often tymes to R. Bro: for houſehold cauſes."

"Richard Brown's s'vice to the late queene, and her mts. ſpeeches and comts. at ſundrie times to him for houſehold cauſes knowen to ſome of the lo: in council and white-ſtaves.

"The houſehold charges abridged from 50,000l. to 44,000l. per ann. for in two offices onlie 2,000l. per ann. abated.—Larder—poultrie—her majeſtie has notwithſtanding told Browne, that in the beginning of her raigne leſſe than 40,000l. defrayed the charge. Browne anſwered, that all provic'ons then weare cheaper. The queene ſaid, that may bee ſoe, and I ſave by the late compoc'on (as I am informed) 10,000l. per ann. and therefore I charge you examyne the difference of ſome yeare in the beginninge of my raigne with one yeares expences now, and lett me underſtand ytt.

"An examinac'on and conference was made betweene the third yeare and the 43d yeare, yt was found that in bread, beare, wyne, wood, coles, wax-lights, torches, tallow-lights, and ſome meete, and other allowances of incidents, neceſſaries, carriages, wages, &c. to the ſome of 12,000l. per ann. at the leaſt, more was ſpent in a°. 43tio. than in a°. 3tio. Regiæ, and no ſufficient warrant for the increaſe, whereby ytt did playnlie appeare, and the booke ſigned by her majeſtie for the honourable allowance to all perſons was not exceeded.

"The queenes majeſtie being informed of this difference, and being therewith moved greatlie, ſaid, And ſhall I ſuffer this? did not I tell you, Browne, what you ſhould fynd, I was never in all my government, ſoe royallie, with nombers of noblemen and ladys attended upon, as in the beginninge of my raigne, all offices in my court being ſupplied, which now are not, and all thoſe then ſatisfied with my allowance, agreed uppon by my councell and ſigned by me, with that care as by all former princes hath bene uſed? And ſhall theſe now that attend, and have the like allowances, not reſt contented?

tented? I will not suffer this dishonourable spoile, and increase that noe prince ever before me did, to the offence of God, and great greavance of my lovinge subjects, who, I understand, daylie complayne, and not without cause, that there is increase daylie of carryadges and of p'vic'on taken from them, at low prices, and wastfulle spent within my court to some of their undoings, and now myself understanding of yt, they may justlie accuse me, to suffer yt, with many other discontented speeches, delivered with great vehemencie, complayninge of the weaknesse of the whitestaves to suffer yt, and accusinge herself for making soe slender choice; with many more speeches, &c. But my speedy order for reformac'on, shall satisfy my lovinge subjects greeved, for I will end as I beganne with my subjects love."

[In another hand is written, "Yt ys no marvell thoughe those grevances were compl. in parliament."]

"Those that are nearest to me, and have dailie great benefit by suits, have these wastfull increases daylie; but my whitestaves and those of my greencloth, by whom all good orders and honourable allowances should be maynteyned, are principal faliers herein, for noe increase can be without their privitie and unlawful warraunt, whereby I fynd the difference of officers now, and in the beginninge of our raigne.

"Whereupon her majesty gave straight charge and commandment to Browne forthwith to repayre to the lo: treasurer, lo: admiral, and the whitestaves of the howshould, (which Browne did,) that order might be taken to abridge all messes of meate, and other expences, more than the booke signed doth allowe, and further said, Myself will speke unto them, and geve them charge, and then let me see or learn, what he in my house that dareth breake and disobey my orders and comanadements signed, with verie bitter speeches, that shee would cleanse her court, and not suffer such a nomber of persons and famylies more than are to bee allowed to bee kept within the court; whereuppon her majesty sent certain noates to the whitestaves, to be put in p'sent execuc'on, in the meane tyme, before the effectinge whereof yt pleased God to take her majesty to his mercie."

Economy was not one of the virtues possessed by James the First (if indeed he possessed any;) and, when he came to the land of plenty, he had no idea of limiting his expences. The estimate for the first year was 76,954l. 2s. $5\frac{1}{4}$d. besides 16,000l. for the prince, making together 92,954l. 2s. $5\frac{1}{4}$d. In his fourth year his household expence was 97,421l. 2s. 3d. From Michaelmas in his seventh year to Michaelmas in the eighth year, it was 129,863l. 9s. $0\frac{1}{2}$d. and yet the king had corn and cattle served by the several counties at underprices, that the farmers might get rid of purveyors, the benefit of which was estimated to the king at 38,000l.

Prince Henry's expences kept pace with his father's. At the first establishment of his household, 20th July, 1 James I. anno 1603, he had servants - - - - 70

A few weeks after a second book was signed, when they were increased to - - - - - - 104

In the next year they amounted to - - 141

besides servants of these servants, who had intruded themselves into the court - - - - - 130

The

The 141 ſoon multiplied into - - - 215
beſides workmen of various ſorts and 13 extraordinary.

In 1608 they were - - - - 233
and with the maſters, the number of ſervants alſo increaſed.

The book ſigned by his royal highneſs in 1610 gives the names of 297 with wages, 129 without, - - 426
beſides various workmen, among whom is Inigo Jones, as ſurveyor of the works.

The following letter, the original of which is amongſt Sir Julius Cæſar's papers, mentioned above, will ſhew the conſequence of this want of management.

" *To the right honourabl my very good Lord the Erl of Dorſet, Lord high Treaſurer of England.*

" According to my duty I have beene always carefull to ſave al needleſs expenſe in the prince's houſe. But the continual increaſe of new ſervants dayly ſent hether by warrante procured without my knowlege, has brought the charge ſo farr out of frame, that it is hard to conceive a courſe how to leſſen it, ſeeing the neceſſary increaſe of many moor will follow the prince's advancement in years and dignitie. Notwithſtanding leaſt I ſhould ſeeme to bee careleſs, or over curious to ſearch into other mens actions, if it ſhall pleaſe your lordp to commande mee by a letter, to call the officers of this houſehold to adviſe of ſome redreſs unto further inconveniencies, I hoope both to give your lordp good accounte of the preſent eſtate of our expenſe, and to make ſome overture how to reforme, or at leaſt to prevent futur accidents. The note that I ſent your lordp conteining a breefe of ſuch orders as I deſir to be ratified for avoyding confuſion and diſorder in the table, I beſeech your lordſhip to conſider of, and to propounde them not ſimply as a ſuite of myne, but as a matter generally requiſite for the better government of his highnes houſe. And as my duty always binds mee I reſt,

Your lordſhip's aſſuredly to commande,

St. James, Jan. 27. THO. CHALONER."

Sir Thomas Chaloner, in a letter to Sir Julius Cæſar, dated 7th of Nov. 1607, mentions ſome of the above circumſtances; ſays he would (at the firſt) have undertaken to maintain the (prince's) houſe to the king's honour for 8000l. yearly, provided they might have good payment of the money; that in the firſt year he diſmiſſed of unneceſſary dependants on the houſe at leaſt three ſcore, whereof many had paſſports to return to their own country, and he utterly refuſed all ſuitors who addreſſed themſelves to him to obtain ſome place about the prince; and then he complains of the great increaſe, without warrant, as well as with, and of the number of ſuitors waiting for places. He ſays, that for the want of ready money the purveyors are forced to take up meate on truſt, and then ſerve it out ſo ſmall and ill, at a price ſo high, that the king had better borrow money at twenty per cent.

It ſeems that King James's ſervants took much pains in endeavouring to leſſen his enormous expence, and formed various projects for that purpoſe. They obtained an account of the French king's houſehold expence, which was not ſo great as King James's. The heads of it were as follow:

The

	£.	s.	d.
The table and kitchen	£.35,718	3	6
The ſtables	7,620	0	0
Domeſtic officers	9,000	0	0
The office of plate	8,180	0	0
The treaſurer of the chamber	12,893	5	0
The gardes du corps	5,400	2	0
The provoſt of the houſehold	3,000	0	0
The hounds and falcons	3,642	14	0
Total	85,454	4	6

	£.	s.	d.
In 1622 King James's expence was reduced to but he ſoon after made additions to it.	78,995	7	8
The houſehold expence of King Charles II. from 1ſt Oct. 1663, to the laſt of Sept. 1664, was	57,275	1	$0\frac{3}{4}$
To which is to be added for the Duke of York	10,000	0	0
The houſehold of King James II. in 1687. Houſehold coffers 76,118 6 $6\frac{1}{4}$; Stables 14,336 19 $1\frac{1}{4}$	90,455	5	8
King William and Queen Mary, 1ſt Oct. 1692, to the laſt of Sept. 1693	114,685	7	$3\frac{1}{2}$
King William alone from 1698 to 1699	90,735	1	$2\frac{1}{4}$
Queen Anne, 2 years Oct. 1703—1705	167,421	4	2
The average	83,710	12	0
1 year, Oct. 1712—1713	89,044	6	10
King George I. Oct. 1715—1716	75,629	7	$7\frac{3}{4}$
1723—1724	86,097	19	$2\frac{1}{4}$
King George II. 1730—1731	118,487	2	$1\frac{3}{4}$
1731—1732	124,806	17	$6\frac{3}{4}$
1ſt Jan. to the laſt of Dec. 1759	108,290	10	$2\frac{1}{2}$

At the acceſſion of his preſent majeſty a conſiderable reduction was made in the houſehold expences. An increaſe attended the increaſe of his family; but they were again reduced in 1782.

ANECDOTES OF MRS. CLARKE, DAUGHTER OF COLLEY CIBBER, ESQ.

CIBBER the elder had a daughter named Charlotte, who alſo took to the ſtage; her ſubſequent life was one continued ſeries of misfortune, afflictions, and diſtreſs, which ſhe ſometimes contrived a little to alleviate by the productions of her pen. About the year 1755, ſhe had worked up a novel for the preſs, which the writer accompanied his friend the bookſeller to hear read; ſhe was at this time a widow, having been married to one Clarke a muſician, long ſince dead. Her habitation was a wretched thatched hovel, ſituated on the way to Iſlington in the purlieus of Clarkenwell bridewell, not very diſtant from the new river head, where at that time it was uſual for the ſcavengers to leave the cleanſings of the ſtreets, and the prieſts of Cloacina to depoſit the offerings from the temples of that all-worſhipped power. The night preceding a heavy rain had fallen, which rendered this extraordinary ſeat of the muſes almoſt inacceſſible, ſo that in our approach we got our white ſtockings inveloped with mud up to the very calves, which furniſhed an appearance

pearance much in the present fashionable style of half boots. We knocked at the door (not attempting to pull the latch-string), which was opened by a tall, meagre, ragged figure, with a blue apron, indicating, what else we might have doubted, the feminine gender. A perfect model for the Copper Captain's tattered landlady; that deplorable exhibition of the fair sex, in the comedy of Rule-a-Wife. She with a torpid voice and hungry smile desired us to walk in. The first object that presented itself was a dresser, clean, it must be confessed, and furnished with three or four coarse delf plates, two brown platters, and underneath an earthen pipkin and a black pitcher with a snip out of it. To the right we perceived and bowed to the mistress of the mansion on a maimed chair under the mantlepiece, by a fire merely sufficient to put us in mind of starving. On one hob sat a monkey, which by way of welcome chattered at our going in; on the other a tabby-cat, of melancholy aspect! and at our author's feet on the flounce of her dingy petticoat reclined a dog, almost a skeleton! he raised his shagged head, and, eagerly staring with his bleared eyes, saluted us with a snarl. "Have done, Fidele! these are friends." The tone of her voice was not harsh; it had something in it humbled and disconsolate; a mingled effort of authority and pleasure—Poor soul! few were her visitors of that description—no wonder the creature barked!—A magpie perched on the top rung of her chair, not an uncomely ornament! and on her lap was placed a mutilated pair of bellows; the pipe was gone, an advantage in their present office, they served as a succedaneum for a writing-desk, on which lay displayed her hopes and treasure, the manuscript of her novel. Her ink-stand was a broken tea-cup, the pen worn to a stump; she had but one! A rough deal board with three hobbling supporters was brought for our convenience, on which without farther ceremony we contrived to sit down, and entered upon business—The work was read, remarks made, alterations agreed to, and thirty guineas demanded for the copy. The squalid handmaiden, who had been an attentive listener, stretched forward her tawny length of neck with an eye of anxious expectation!—The bookseller offered five!—Our authoress did not appear hurt; disappointments had rendered her mind callous; however some altercation ensued. This was the writer's first initiation into the mysteries of bibliopolism and the state of author-craft. He, seeing both sides pertinacious, at length interposed, and at his instance the wary haberdasher of literature doubled his first proposal, with this saving proviso, that his friend present would pay a moiety and run one half the risk; which was agreed to. Thus matters were accommodated, seemingly to the satisfaction of all parties; lady's original stipulation of fifty copies for herself being previously acceded to. Such is the story of the once-admired daughter of Colley Cibber, poet-laureate and patentee of Drury-lane, who was born in affluence and educated with care and tenderness, her servants in livery, and a splendid equipage at her command, with swarms of time-serving sycophants officiously buzzing in her train; yet, unmindful of her advantages and improvident in her pursuits, she finished the career of her miserable existence on a dunghill.

The account given of this unfortunate woman is literally correct in every particular, of which, except the circumstance of her death, the writer himself was an eye-witness.

PYROTECHNY; OR THE ART OF PREPARING ALL KINDS OF FIRE-WORKS.—Continued from p. 118.

DIFFERENT KINDS of ROCKETS, with their APPENDAGES and COMBINATIONS.

To fix one Rocket on the top of another.

WHEN ſky-rockets are thus managed, they are called towering rockets, on account of their mounting ſo very high. Towering rockets are made after this manner: Fix on a pound-rocket a head without a collar; then take a four-ounce rocket, which may be headed or bounced, and rub the mouth of it with meal powder wetted with ſpirit of wine: when done, put it in the head of the large rocket with its mouth downwards; but before you put it in ſtick a bit of quick-match in the hole of the clay of the pound-rocket, which match ſhould be long enough to go a little way up the bore of the ſmall rocket, to fire it when the large is burnt out; the 4-ounce rocket being too ſmall to fill the head of the other, roll round it as much tow as will make it ſtand upright in the centre of the head: the rocket being thus fixed, paſte a ſingle paper round the opening of the top of the head of the large rocket. The large rocket muſt have only half a diameter of charge rammed above the piercer; for, if filled to the uſual height, it would turn before the ſmall one takes fire, and entirely deſtroy the intended effect: when one rocket is headed with another, there will be no occaſion for any blowing powder; for the force with which it ſets off will be ſufficient to diſengage it from the head of the firſt fired rocket. The ſticks for theſe rockets muſt be a little longer than for thoſe headed with ſtars, rains, &c.

Caduceus Rockets, in riſing, form two ſpiral lines, or double worm, by reaſon of their being placed obliquely, one oppoſite the other; and their counterpoiſe in their centre, which cauſes them to riſe in a vertical direction. Rockets for this purpoſe muſt have their ends choaked cloſe, without either head or bounce, for a weight at top would be a great obſtruction to their mounting; though I have known them ſometimes to be bounced, but then they did not riſe ſo high as thoſe that were not; nor do any caduceus rockets aſcend ſo high as ſingle, becauſe of their ſerpentine motion, and likewiſe the reſiſtance of air, which is much greater than two rockets of the ſame ſize would meet with if fired ſingly.

For fixing theſe rockets the ſticks muſt have all their ſides alike, which ſides ſhould be equal to the breadth of a ſtick proper for a ſky-rocket of the ſame weight as thoſe you intend to uſe, and to taper downwards as uſual, long enough to balance them, one length of a rocket from the croſs ſtick; which muſt be placed from the large ſtick 6 diameters of one of the rockets, and its length 7 diameters; ſo that each rocket, when tied on may form with the large ſtick an angle of 60 degrees. In tying on the rockets, place their heads on the oppoſite ſides of the croſs ſtick, and their ends on the oppoſite ſides of the long ſtick; then carry a leader from the mouth of one into that of the other. When theſe rockets are to be fired, ſuſpend them between two hooks or nails, then burn the leader through the middle, and both will take fire at the ſame time. Rockets of 1 lb. are a good ſize for this uſe.

Honorary

Honorary Rockets are the same as sky-rockets, except that they carry no head nor report, but are closed at top, on which is fixed a cone; then on the case, close to the top of the stick, you tie on a 2-ounce case, about 5 or 6 inches long, filled with a strong charge, and pinched close at both ends; then in the reverse sides, at each end, bore a hole in the same manner as in tourbillons; from each hole carry a leader into the top of the rocket. When the rocket is fired, and arrived to its proper height, it will give fire to the case at top; which will cause both rocket and stick to spin very fast in their return, and represent a worm of fire descending to the ground. There is another method of placing the small case, which is by letting the stick rise a little above the top of the rocket, and tying the case to it, so as to rest on the rocket: these rockets have no cones. There is also a third method by which they are managed, which is thus: In the top of a rocket fix a piece of wood, in which drive a small iron spindle; then make a hole in the middle of the small case, through which put the spindle: then fix on the top of it a nut, to keep the case from falling off; when this is done, the case will turn very fast, without the rocket: but this method does not answer so well as either of the former.

To divide the Tail of a Sky-rocket so as to form an Arch when ascending.—Having some rockets made, and headed according to fancy, and tied on their sticks; get some sheet tin, and cut it into round pieces about 3 or 4 inches diameter; then on the stick of each rocket, under the mouth of the case, fix one of these pieces of tin 16 inches from the rocket's neck, and support it by a wooden bracket, as strong as possible: the use of this is, that when the rocket is ascending the fire will play with great force on the tin, which will divide the tail in such a manner that it will form an arch as it mounts, and will have a very good effect when well managed: if there is a short piece of port-fire, of a strong charge, tied to the end of the stick, it will make a great addition; but this must be lighted before you fire the rocket.

To make several Sky-rockets rise in the same Direction, and equally distant from each other.—Take six, or any number of sky-rockets, of what size you please, then cut some strong packthread into pieces of 3 or 4 yards long, and tie each end of these pieces to a rocket in this manner: Having tied one end of your packthread round the body of one rocket, and the other end to another, take a second piece of packthread, and make one end of it fast to one of the rockets already tied, and the other end to a third rocket, so that all the rockets, except the two outside, will be fastened to two pieces of packthread: the length of thread from one rocket to the other may be what the maker pleases; but the rockets must be all of a size, and their heads filled with the same weight of stars, rains, &c.

Having thus done, fix in the mouth of each rocket a leader of the same length; and when you are going to fire them, hang them almost close; then tie the ends of the leaders together, and prime them: this prime being fired, all the rockets will mount at the same time, and divide as far as the strings will allow; which division they will keep, provided they are all rammed alike, and well made. They are called by some chained rockets.

Signal Sky-rockets are made of several kinds, according to the different signals intended to be given; but in artificial fire-works, two sorts are only used, which are one with reports and the other with-

out; but thofe for the ufe of the navy and army are headed with ftars, ferpents, &c.——Rockets which are to be bounced muft have their cafes made $1\frac{1}{2}$ or 2 diameters longer than the common proportion; and after they are filled, drive in a double quantity of clay, then bounce and pinch them after the ufual manner, and fix on each a cap.

Signal fky-rockets without bounces, are only fky-rockets clofed and capped: thefe are very light, therefore do not require fuch heavy fticks as thofe with loaded heads; for which reafon you may cut one length of the rocket off the ftick, or elfe make them thinner. Signal rockets with reports are fired in fmall flights; and often both thefe, and thofe without reports, are ufed for a fignal to begin firing a collection of works.

To fix a Sky-rocket with its Stick on the top of another.—Rockets thus managed make a pretty appearance, by reafon of a frefh tail being feen when the fecond rocket takes fire, which will mount to a great height. The method of preparing thefe rockets is thus: Having filled a two-pounder, which muft be filled only half a diameter above the piercer, and its head not more than 10 or 12 ftars; the ftick of this rocket muft be made a little thicker than common; and, when made, cut it in half the flat way, and in each half make a groove, fo that, when the two halves are joined, the hollow made by the grooves may be large enough to hold the ftick of a half-pound rocket; which rocket make and head as ufual: put the ftick of this rocket into the hollow of the large one, fo far that the mouth of the rocket may reft on the head of the two-pounder; from whofe head carry a leader into the mouth of the fmall rocket; which being done, your rockets will be ready for firing.

To fix two or more Sky-rockets on one Stick.—Two, three, or fix, fky-rockets, fixed on one ftick, and fired together, make a grand and beautiful appearance; for the tails of all will feem but as one of an immenfe fize, and the breaking of fo many heads at once will refemble the burfting of an air-balloon. The management of this device requires a fkilful hand; but if the following inftructions be well obferved, even by thofe who have not made a great progrefs in this art, there will be no doubt of the rockets having the defired effect.—Rockets for this purpofe muft be made with the greateft exactnefs, all rammed by the fame hand, in the fame mould, and out of the fame proportion of compofition; and after they are filled and headed, muft all be of the fame weight. The ftick muft alfo be well made (and proportioned) to the following directions: firft, fuppofing your rockets to be $\frac{1}{2}$ pounders, whofe fticks are 6 feet 6 inches long, then if 2, 3, or 6, of thefe are to be fixed on one ftick, let the length of it be 9 feet 9 inches; then cut the top of it into as many fides as there are rockets, and let the length of each fide be equal to the length of 1 of the rockets without its head; and in each fide cut a groove (as ufual); then from the grooves plane it round, down to the bottom, where its thicknefs muft be equal to half the top of the round part. As their thicknefs cannot be exactly afcertained, we fhall give a rule which generally anfwers for any number of rockets above two: the rule is this; that the ftick at top muft be thick enough, when the grooves are cut, for all the rockets to lie, without preffing each other, though as near as poffible.

When only 2 rockets are to be fixed on one ftick, let the length of the

the ſtick be the laſt given proportion, but ſhaped after the common method, and the breadth and thickneſs double the uſual dimenſions. The point of poiſe muſt be in the uſual place (let the number of rockets be what they will): if ſticks made by the above directions ſhould be too heavy, plane them thinner; and, if too light, make them thicker; but always make them of the ſame length.

When more than two rockets are tied on one ſtick, there will be ſome danger of their flying up without the ſtick, unleſs the following precaution is taken: For caſes being placed on all ſides, there can be no notches for the cord which ties on the rockets to lie in; therefore, inſtead of notches, drive a ſmall nail in each ſide of the ſtick, between the necks of the caſes: and let the cord, which goes round their necks, be brought cloſe under the nails; by this means the rockets will be as ſecure as when tied on ſingly. Your rockets being thus fixed, carry a quick-match, without a pipe, from the mouth of one rocket to the other; this match being lighted will give fire to all at once.

Though the directions already given may be ſufficient for theſe rockets, we ſhall here add an improvement on a very eſſential part of this device, which is, that of hanging the rockets to be fired; for before the following method was hit upon, many eſſays proved unſucceſsful. Inſtead, therefore, of the old and common manner of hanging them on nails or hooks, make uſe of this contrivance: Have a ring made of ſtrong iron wire, large enough for the ſtick to go in as far as the mouths of the rockets; then let this ring be ſupported by a ſmall iron, at ſome diſtance from the poſt or ſtand to which it is fixed; then have another ring, fit to receive and guide the ſmall end of the ſtick. Rockets thus ſuſpended will have nothing to obſtruct their fire; but, when they are hung on nails or hooks, in ſuch a manner that ſome of their mouths are againſt or upon a rail, there can be no certainty of their riſing in a vertical direction.

To fire Sky-rockets without Sticks.—You muſt have a ſtand, of a block of wood, a foot diameter, and make the bottom flat, ſo that it may ſtand ſteady: in the centre of the top of this block draw a circle 2½ inches diameter, and divide the circumference of it into three equal parts; then take 3 pieces of thick iron wire, each about 3 feet long, and drive them into the block, one at each point made on the circle; when theſe wires are drove in deep enough to hold them faſt and upright, ſo that the diſtance from one to the other is the ſame at top as at bottom, the ſtand is complete.

The ſtand being thus made, prepare your rockets thus: Take ſome common ſky-rockets, of any ſize, and head them as you pleaſe; then get ſome balls of lead, and tie to each a ſmall wire 2 or 2½ feet long, and the other end of each wire tie to the neck of a rocket. Theſe balls anſwer the purpoſe of ſticks when made of a proper weight, which is about ⅔ the weight of the rocket; but, when they are of a proper ſize, they will balance the rocket in the ſame manner as a ſtick, at the uſual point of poiſe. To fire theſe, hang them, one at a time, between the tops of the wires, letting their heads reſt on the point of the wires, and the balls hang down between them: if the wires ſhould be too wide for the rockets, preſs them together till they fit; and, if too cloſe, force them open; the wires for this purpoſe muſt be ſoftened, ſo as not to have any ſpring, or they will not keep their poſition when preſſed cloſe or opened.

 Rain-

Rain-falls and Stars for Sky-rockets, double and single.—Gold and silver rain compositions are drove in cases that are pinched quite close at one end: if you roll them dry, 4 or 5 rounds of paper will be strong enough; but, if they are pasted, 3 rounds will do; and the thin sort of cartridge-paper is best for those small cases, which in rolling you must not turn down the inside edge as in other cases, for a double edge would be too thick for so small a bore. The moulds for rain-falls should be made of brass, and turned very smooth in the inside; or the cases, which are so very thin, would tear in coming out; for the charge must be drove in tight; and the better the case fits the mould, the more driving it will bear. These moulds have no nipple, but instead thereof they are made flat. As it would be very tedious and troublesome to shake the composition out of such small ladles as are used for these cases, it will be necessary to have a funnel made of thin tin, to fit on the top of the case, by the help of which you may fill them very fast. For single rain-falls for 4-ounce rockets, let the diameter of the former be $\frac{2}{16}$ of an inch, and the length of the case 2 inches; for 8-ounce rockets, $\frac{4}{16}$, and 2 diameters of the rocket long; for 1-pound rockets, $\frac{5}{16}$, and 2 diameters of the rocket long; for 2-pound rockets, $\frac{5}{16}$, and $3\frac{1}{2}$ inches long; for 4-pound rockets, $\frac{6}{16}$, and $4\frac{1}{2}$ inches long; and for 6-pounders, $\frac{7}{16}$ diameter, and 5 inches long.

Of double rain-falls there are two sorts. For example, some appear first like a star, and then as rain; and some appear first as rain, and then like a star. When you would have stars first, you must fill the cases, within $\frac{1}{2}$ inch of the top, with rain-composition, and the remainder with star-composition; but when you intend the rain should be first, drive the case $\frac{1}{2}$ an inch with star-composition, and the rest with rain. By this method may be made many changes of fire; for in large rockets you may make them first burn as stars, then rain, and again as stars; or they may first show rain, then stars, and finish with a report; but when they are thus managed, cut open the first rammed end, after they are filled and bounced, at which place prime them. The star composition for this purpose must be a little stronger than for rolled stars.

Strung Stars.—First take some thin paper, and cut it into pieces of $1\frac{1}{2}$ inch square, or thereabouts; then on each piece lay as much dry star-composition as you think the paper will easily contain; then twist up the paper as tight as you can; when done, rub some paste on your hands, and roll the stars between them; then set them to dry: your stars being thus made, get some flax or fine tow, and roll a little of it over each star; then paste your hands and roll the stars as before, and set them again to dry; when they are quite dry, with a piercer make a hole through the middle of each, into which run a cotton quick-match, long enough to hold 10 or 12 stars at 3 or 4 inches distance: but any number of stars may be strung together by joining the match.

Tailed Stars.—These are called tailed stars, because there are a great number of sparks issue from them, which represent a tail like that of a comet. Of these there are two sorts; which are rolled, and drove: when rolled, they must be moistened with a liquor made of half a pint of spirit of wine and half a gill of thin size, of this as much as will wet the composition enough to make it roll easy; when they are rolled, sift meal-powder over them, and set them to dry.

When

When tailed ſtars are drove, the compoſition muſt be moiſtened with ſpirit of wine only, and not made wet as for rolling: 1 and 2 oz. caſes, rolled dry, are beſt for this purpoſe; and, when they are filled, unrol the caſe within 3 or 4 rounds of the charge, and all that you unrol cut off; then paſte down the looſe edge: 2 or 3 days after the caſes are filled, cut them in pieces 5 or 6-8ths of an inch in length: then melt ſome wax, and dip one end of each piece into it, ſo was to cover the compoſition: the other end muſt be rubbed with meal-powder wetted with ſpirit of wine.

Drove Stars.—Caſes for drove ſtars are rolled with paſte, but are made very thin of paper. Before you begin to fill them, damp the compoſition with ſpirit of wine that has had ſome camphor diſſolved in it: you may ram them indifferently hard, ſo that you do not break or ſack the caſe; to prevent which, they ſhould fit tight in the mould. They are drove in caſes of ſeveral ſizes, from 8 drams to 4 oz. When they are filled in $\frac{1}{2}$ oz. caſes, cut them in pieces of $\frac{3}{4}$ of an inch long; if 1 oz. caſes, cut them in pieces of 1 inch; if 2-ounce caſes, cut them in pieces of $1\frac{1}{4}$ inch long; and, if 4 oz. caſes, cut them in pieces of $1\frac{1}{2}$ inch long: having cut your ſtars of a proper ſize, prime both ends with wet meal-powder. Theſe ſtars are ſeldom put in rockets, they being chiefly intended for air-balloons, and drove in caſes, to prevent the compoſition from being broke by the force of the blowing powder in the ſhell.

Rolling Stars are commonly made about the ſize of a muſket-ball; though they are rolled of ſeveral ſizes, from the bigneſs of a piſtol-ball to 1 inch diameter; and ſometimes very ſmall, but are then called *ſparks*. Great care muſt be taken in making ſtars, firſt, that the ſeveral ingredients are reduced to a fine powder; ſecondly, that the compoſition is well worked and mixed. Before you begin to roll, take about a pound of compoſition, and wet it with the following liquid, enough to make it ſtick together and roll eaſy:—Spirit of wine 1 quart, in which diſſolve $\frac{1}{4}$ of an ounce of iſinglaſs. If a great quantity of compoſition be wetted at once, the ſpirit will evaporate, and leave it dry, before you can roll it into ſtars: having rolled up one proportion, ſhake the ſtars in meal-powder, and ſet them to dry, which they will do in three or four days; but, if you ſhould want them for immediate uſe, dry them in an earthen pan over a ſlow heat, or in an oven. It is very difficult to make the ſtars all of an equal ſize when the compoſition is taken up promiſcuouſly with the fingers; but by the following method they may be made very exact:—When the mixture is moiſtened properly, roll it on a flat ſmooth ſtone, and cut it into ſquare pieces, making each ſquare large enough for the ſtars you intend. There is another method uſed by ſome to make ſtars, which is by rolling the compoſition in long pieces, and then cutting off the ſtar, ſo that each ſtar will be of a cylindrical form: but this method is not ſo good as the former; for, to make the compoſition roll this way, it muſt be made very wet, which makes the ſtars heavy, as well as weakens them. All ſtars muſt be kept as much from air as poſſible, otherwiſe they will grow weak and bad.

Scrolls of Sky-rockets.—Caſes for ſcrolls ſhould be made four or five inches in length, and their interior diameter 3-8ths of an inch: one end of theſe caſes muſt be pinched quite cloſe, before you begin to fill; and, when filled, cloſe the other end: then in the oppoſite ſides make

make a ſmall hole at each end, to the compoſition, in the ſame manner as in tourbillons; and prime them with wet meal-powder. You may put in the head of a rocket as many of theſe caſes as it will contain: being fired, they turn very quick in the air, and form a ſcroll or ſpiral line. They are generally filled with a ſtrong charge, as that of ſerpents or brilliant fire.

Swarmers, or ſmall Rockets.—Rockets that go under the denomination of *ſwarmers*, are thoſe from 2 oz. downwards. Theſe rockets are fired ſometimes in flights, and in large water-works, &c. Swarmers of 1 and 2 oz. are bored, and made in the ſame manner as large rockets, except that, when headed, their heads muſt be put on without collars: the number of ſtrokes for driving 1 oz. muſt be 8, and for 2 oz. 12.

All rockets under 1 oz. are not bored, but muſt be filled to the uſual height with compoſition, which generally conſiſts of fine meal-powder 4 oz. and charcoal or ſteel-duſt 2 drams: the number of ſtrokes for ramming theſe ſmall ſwarmers is not material, provided they are rammed true, and moderately hard. The necks of unbored rockets muſt be in the ſame proportion as in common caſes.

Stands for Sky-rockets.—Care muſt be taken, in placing the rockets when they are to be fired, to give them a vertical direction at their firſt ſetting out; which may be managed thus:—Have two rails of wood, of any length, ſupported at each end by a perpendicular leg, ſo that the rails be horizontal, and let the diſtance from one to the other be almoſt equal to the length of the ſticks of the rockets intended to be fired; then in the front of the top rail drive ſquare hooks at 8 inches diſtance, with their points turning ſidewiſe, ſo that, when the rockets are hung on them, the points will be before the ſticks, and keep them from falling or being blown off by the wind: in the front of the rail at bottom muſt be ſtaples, drove perpendicular under the hooks at top; through theſe ſtaples put the ſmall ends of the rocket-ſticks. Rockets are fired by applying a lighted port-fire to their mouths. When ſky-rockets are made to perfection, and fired, they will ſtand 2 or 3 ſeconds on the hook before they riſe, and then mount up briſkly, with a ſteady motion, carrying a large tail from the ground all the way up, and juſt as they turn break and diſperſe the ſtars.

Girandole Cheſts for Flights of Rockets.—Theſe are generally compoſed of four ſides, of equal dimenſions; but may be made of any diameter, according to the number of rockets deſigned to be fired; its height muſt be in proportion to the rockets, but muſt always be a little higher than the rockets with their ſticks. When the ſides are joined, fix in the top, as far down the cheſt as the length of one of the rockets with its cap on. In this top, make as many ſquare or round holes to receive the rocket-ſticks, as you intend to have rockets; but let the diſtance between them be ſufficient for the rockets to ſtand without touching one another; then from one hole to another cut a groove large enough for a quick-match to lie in: the top being thus fixed, put in the bottom, at about 1½ foot diſtance from the bottom of the cheſt; in this bottom muſt be as many holes as in the top, and all to correſpond; but theſe holes need not be ſo large as thoſe in the top.

To prepare your cheſt, you muſt lay a quick-match, in all the grooves, from the hole to hole; then take ſome ſky-rockets, and rub them

them in the mouth with wet meal-powder, and put a bit of match up the cavity of each; which match muſt be long enough to hang a little below the mouth of the rocket. Your rockets and cheſt being prepared according to the above directions, put the ſticks of the rockets through the holes in the top and bottom of the cheſt, ſo that their mouths may reſt on the quick-match in the grooves: by which all the rockets will be fired at once; for, by giving fire to any part of the match, it will communicate to all the rockets in an inſtant. As it would be rather troubleſome to direct the ſticks from the top to the proper holes in the bottom, it will be neceſſary to have a ſmall door in one of the ſides, which, when opened, you may ſee how to place the ſticks. Flights of rockets being ſeldom ſet off at at the beginning of any fire-works, they are in danger of being fired by the ſparks from wheels, &c. therefore, to preſerve them, a cover ſhould be made to fit on the cheſt, and the door in the ſide kept ſhut.

Serpents or Snakes for Pots of Aigrettes, ſmall Mortars, Sky-rockets, &c.—Serpents for this uſe are made from 2½ inches to 7 inches long, and their formers from 3-16ths to 5-8ths of an inch diameter; but the diameter of the caſes muſt always be equal to 2 diameters of the former. They are rolled and choaked like other caſes, and filled with compoſition from 5-8ths of an inch to 1½ inch high, according to the ſize of the mortars or rockets they are deſigned for; and the remainder of the caſes bounced with corn-powder, and afterwards their ends pinched and tied cloſe: before they are uſed, their mouths muſt be primed with wet meal-powder.

Leaders, or Pipes of Communication.—The beſt paper for leaders is elephant; which you cut into long ſlips 2 or 3 inches broad, ſo that they may go 3 or 4 times round the former, but not more: when they are very thick, they are too ſtrong for the paper which faſtens them to the works, and will ſometimes fly off without leading the fire. The formers for theſe leaders are made from 2 to 6-16ths of an inch diameter; but 4 16ths is the ſize generally made uſe of. The formers are made of ſmooth braſs wire: when you uſe them, rub them over with greaſe, or keep them wet with paſte, to prevent their ſticking to the paper, which muſt be paſted all over. In rolling of pipes, make uſe of a rolling-board, but uſe it lightly: having rolled a pipe, draw out the former with one hand, holding the pipe as light as poſſible with the other; for, if it preſs againſt the former, it will ſtick and tear the paper. Make your leaders of different lengths, or in clothing of works you will cut a great many to waſte. Leaders for marron batteries muſt be made of ſtrong cartridge paper.

Crackers.—Cut ſome cartridge paper into pieces 3½ inches broad, and one foot long; one edge of each fold down lengthwiſe about ¾ of an inch broad; then fold the double edge down ¼ of an inch, and turn the ſingle edge back half over the double fold; then open it, and lay all along the channel, which is formed by the folding of the paper, ſome meal-powder; then fold it over and over till all the paper is doubled up, rubbing it down every turn; this done, bend it backwards and forwards, 2½ inches, or thereabouts, at a time, as oft as the paper will allow; then hold all theſe folds flat and cloſe, and with a ſmall pinching cord give one turn round the middle of the cracker, and pinch it cloſe; then bind it with a packthread as tight as you can; then, in the place where it was pinched, prime one end of it, and cap it with touch-paper. When theſe crackers are

are fired, they will give a report at every turn of the paper: if you would have a great number of bounces, you muſt cut the paper longer, or join them after they are made; but, if they are made very long before they are pinched, you muſt have a piece of wood with a groove in it, deep enough to let in half the cracker; this will hold it ſtraight while it is pinching.

Single Reports.—Caſes for reports are generally rolled on one and two oz. formers, and ſeldom made larger but on particular occaſions; they are made from two to four inches long, and very thick of paper. Having rolled a caſe, pinch one end quite cloſe, and drive it down: then fill the caſe with corn-powder, only leaving room to pinch it at top; but before you pinch it, put in a piece of paper at top of the powder. Reports are fired by a vent, bored in the middle, at one end, juſt as required.

Marrons.—Formers for marrons are from $\frac{3}{4}$ of an inch to $1\frac{1}{2}$ diameter. Cut the paper for the caſes twice the diameter of the former broad, and long enough to go three times round: when you have rolled a caſe, paſte down the edge and tie one end cloſe; then with the former drive it down to take away the wrinkles, and make it flat at bottom; then fill the caſe with corn-powder one diameter and $\frac{1}{4}$ high, and fold down the reſt of the caſe tight on the powder. The marron being thus made, wax ſome ſtrong pack-thread with ſhoemakers wax; this thread wind up in a ball, then unwind two or three yards of it, and that part which is near the ball make faſt to a hook; then take a marron, and ſtand as far from the hook as the pack-thread will reach, and wind it lengthwiſe round the marron as cloſe as you can, till it will hold no more that way; then turn it, and wind the pack-thread on the ſhort way, then lengthwiſe again, and ſo on till the paper is all covered; then make faſt the end of the pack-thread, and beat down both ends of the marron to bring it in ſhape. The method of firing marrons is by making a hole at one end with an awl, and putting in a piece of quick-match; then take a piece of ſtrong paper, in which wrap up the marron with two leaders, which muſt be put down to the vent, and the paper tied tight round them with ſmall twine: theſe leaders are bent on each ſide, and their looſe ends tied to other marrons, and are nailed in the middle to the rail of the ſtand. The uſe of winding the pack-thread in a ball is, that you may let it out as you want it, according to the quantity the marron may require; and that it may not be tied in knots, which would ſpoil the marron.

Marron Batteries, if well managed, will keep time to a march, or a ſlow piece of muſic. Marron batteries are made of ſeveral ſtands, with a number of croſs rails for the marrons; which are regulated by leaders, by cutting them of different lengths, and nailing them tight, or looſe, according to the time of the muſic. In marron batteries you muſt uſe the large and ſmall marrons, and the nails for the pipes muſt have flat heads.

Line Rockets.—Are made and drove as the ſky-rockets, but have no heads, and the caſes muſt be cut cloſe to the clay: they are ſometimes made with ſix or ſeven changes, but in general not more than four or five. The method of managing thoſe rockets is thus:—Firſt, have a piece of light wood, the length of one of the rockets, turned round about $2\frac{1}{2}$ inches diameter, with a hole through the middle lengthwiſe, large enough for the line to go eaſily through:

if you design four changes, have four grooves cut in the swivel, one opposite the other, to lay the rockets in.

The mouths of the rockets being rubbed with wet meal-powder, lay them in the grooves head to tail, and tie them fast; from the tail of the first rocket carry a leader to the mouth of the second, and from the second to the third, and so on to as many as there are on the swivel, making every leader very secure; but, in fixing these pipes, take care that the quick-match does not enter the bores of the rockets: the rockets being fixed on the swivel and ready to be fired, have a line 100 yards long, stretched and fixed up tight, at any height from the ground; but be sure to place it horizontally: this length of line will do for $\frac{1}{2}$lb. rockets; but if larger, the line must be longer. Before you put up the line, put one end of it thro' the swivel; and, when you fire the line-rocket, let the mouth of that rocket which you fire first face that end of the line where you stand; then the first rocket will carry the rest to the other end of the line, and the second will bring them back; and so they will run out and in according to the number of rockets: at each end of the line there must be a piece of flat wood for the rocket to strike against, or its force will cut the line. Let the line be well soaped, and the hole in the swivel very smooth.

Different Decorations for Line Rockets.—To line rockets may be fixed great variety of figures, such as flying dragons, Mercuries, ships, &c. Or they may be made to run on the line like a wheel; which is done in this manner. Have a flat swivel made very exact, and on it tie two rockets obliquely, one on each side, which will make it turn round all the way it goes, and form a circle of fire; the charge for these rockets should be a little weaker than common. If you would shew two dragons fighting, get two swivels made square, and on each tie three rockets together on the under side; then have two flying dragons made of tin, and fix one of them on the top of each swivel, so as to stand upright; in the mouth of each dragon put a small case of common fire, and another at the end of the tail; you may put two or three port-fires, of a strong charge, on one side of their bodies, to shew them. This done, put them on the line, one at each end; but let there be a swivel in the middle of the line to keep the dragons from striking together: before you fire the rockets, light the cases on the dragons; and, if care be taken in firing both at the same time, they will meet in the middle of the line, and seem to fight. Then they will run back and return with great violence; which will have a very pleasing effect. The line for these rockets must be very long, or they will strike too hard together.

Chinese Flyers.—Cases for flyers may be made of different sizes, from one to eight ounces: they must be made thick of paper, and eight interior diameters long; they are rolled in the same manner as tourbillons, with a straight pasted edge, and pinched close at one end. The method of filling them is, the case being put in a mould, whose cylinder, or foot, must be flat at top without a nipple, fill it within $\frac{1}{2}$ a diameter of the middle; then ram in $\frac{1}{2}$ a diameter of clay, on that as much composition as before, on which drive $\frac{1}{2}$ a diameter of clay; then pinch the case close, and drive it down flat: after this is done, bore a hole exactly through the centre of the clay in the middle; then in the opposite sides, at both ends, make a vent; and in that side you intend to fire first make a small hole to the composition

near the clay in the middle, from which carry a quick-match, covered with a single paper, to the vent at the other end; then, when the charge is burnt on one side, it will, by means of the quick-match, communicate to the charge on the other (which may be of a different sort). The flyers being thus made, put an iron pin, that must be fixed in the work on which they are to be fired, and on which they are to run, through the hole in the middle: on the end of this pin must be a nut to keep the flyer from running off. If you would have them turn back again after they are burnt, make both the vents at the ends on the same side, which will alter its course the contrary way.

Table Rockets are designed merely to shew the truth of driving, and the judgment of a fire-worker, they having no other effect, when fired, than spinning round in the same place where they begin, till they are burnt out, and shewing nothing more than an horizontal circle of fire.

The method of making these rockets is—Have a cone turned out of hard wood 2½ inches diameter, and as much high; round the base of it draw a line; on this line fix four spokes, two inches long each, so as to stand one opposite the other; then fill four nine-inch one-pound cases with any strong composition, within two inches of the top: these cases are made like tourbillons, and must be rammed with the greatest exactness. Your rockets being filled, fix their open ends on the short spokes; then in the side of each case bore a hole near the clay; all these holes, or vents, must be so made that the fire of each case may act the same way; from these vents carry leaders to the top of the cone, and tie them together. When you would fire the rockets, set them on a smooth table, and light the leaders in the middle, and all the cases will fire together, and spin on the point of the cone.

These rockets may be made to rise like tourbillons, by making the cases shorter, and boring four holes in the under side of each at equal distances: this being done, they are called double tourbillons. All the vents in the under side of the cases must be lighted at once; and the sharp point of the cone cut off, at which place make it spherical.

SHORT ACCOUNT OF RICHARD BAXTER.

RICHARD BAXTER, an eminent divine among the con-conformists, was born at Rowton in Shropshire, November 12, 1615; and distinguished himself by his exemplary life, his pacific and moderate principles, and his numerous writings. Upon the opening of the long parliament, he was chosen vicar of Kidderminster. In the heat of the civil wars he withdrew from that town to Coventry, and preached to the garrison and inhabitants. When Oliver Cromwell was made protector, he would by no means comply with his measures, though he preached before him. He came to London and preached before the parliament the day before they voted the return of Charles II. who upon his restoration appointed him one of his chaplains in ordinary. He assisted at the conference in the Savoy, as one of the commissioners for stating the fundamentals in religion, and then drew up a reformed liturgy. He was offered the bishopric of Hereford, which he refused, affecting no higher perferment than the liberty of continuing minister of Kidderminster; which he

he could not obtain, for he was not permitted to preach there above twice after the restoration. Whereupon he returned to London, and preached occasionally about the city, till the act of uniformity took place. In 1662, Mr. Baxter was married to Margaret Charleton, daughter to Francis Charleton, Esq. of the county of Salop. She was a woman of great piety, and entered thoroughly into her husband's views concerning religion. During the plague in 1665 he retired into Buckinghamshire; but afterwards returned to Acton, where he staid till the act against conventicles expired; and then his audience was so large that he wanted room. Upon this he was committed to prison; but, procuring an habeas corpus, he was discharged. After the indulgence in 1672, he returned to London; and in 1682 he was seized for coming within five miles of a corporation. In 1684 he was seized again; and in the reign of James II. was committed prisoner to the King's Bench, and tried before the Lord Chief Justice Jefferies for his Paraphrase on the New Testament, which was called a scandalous and seditious book against the government. He continued in prison two years; from whence he was at last discharged, and had his fine remitted by the king. He died December 8, 1691; and was buried in Christ-church. He was honoured with the friendship of some of the greatest and best men in the kingdom, as the Earl of Lauderdale, the Earl of Balcarras, Lord Chief Justice Hales, Dr. Tillotson, &c. and held correspondence with some of the most eminent foreign divines. He wrote above 120 books, and had above sixty written against him. Mr. Granger's character of him is very striking. "Richard Baxter (says he) was a man famous for weakness of body and strength of mind; for having the strongest sense of religion himself, and exciting a sense of it in the thoughtless and profligate; for preaching more sermons, engaging in more controversies, and writing more books, than any other non-conformist of his age. He spoke, disputed, and wrote, with ease; and discovered the same intrepidity when he reproved Cromwell and expostulated with Charles II. as when he preached to a congregation of mechanics. His zeal for religion was extraordinary; but it seems never to have prompted him to faction, or carried him to enthusiasm." Among his most famous works were, 1. The Saints Everlasting Rest. 2. Call to the Unconverted, of which 20,000 were sold in one year; and it was translated not only into all the European languages, but into the Indian tongue. 3. Poor Man's Family Book. 4. Dying Thoughts; and, 5. A Paraphrase on the New Testament. His practical works have been printed in four volumes folio.

ACCOUNT OF THE NIMIQUAS, A NATION OF SOUTHERN AFRICA.

[From LE VAILLANT'S New Travels into the interior Parts of Africa.]

WHEN I entered the Nimiqua country, my design was to investigate every thing that had been said of it at the Cape. How many tales had I not heard of this nation! what wonderful things concerning its manners, its arts, its treasures, &c. The reader knows already what to think of its pretended mines of gold

and ſilver: and the tales of its arts and its laws are on a par with thoſe of its mines.

Kolben is the man who has ſtamped authority on all theſe fables. Even I, having no idea reſpecting theſe diſtant and unknown people, gave ſome credit to the dreams of this writer. In conſequence, as I penetrated into the interior of Africa, and viſited the Hottentots, I every where ſought the traces of that flouriſhing agriculture, "which they underſtand incomparably better than the Europeans of the Cape, who frequently apply to them for advice on the ſubject." I was deſirous of ſeeing ſome of thoſe ſolemn marriage ceremonies, which a prieſt performs, and which he legitimates by ſprinkling the newly-united couple with his urine. I wiſhed to viſit the public priſons of theſe people, and be preſent at the ſittings of their tribunals, and the decrees of their ſovereign council. Perhaps I had deſtroyed monſters enough in Africa to aſpire to the honour of being admitted into that order of knighthood; the progreſs and ceremonials of which the hiſtorian has deſcribed with no leſs pomp than minuteneſs. Alas! all theſe ſplendid chimeras vaniſhed before me. Religion, police, laws, military tactics, orders of battle, treaties of peace, experienced generals, priſoners of war, vanquiſhers and vanquiſhed, were all romances, exiſting only in the brain of the author, and in the taverns where they had been told him by thoſe who made him their ſport.

Thirty or forty years after the publication of his voyage, Abbé de la Caille made ſome ſtay at the Cape, and thus was enabled, on ſome points at leaſt, to paſs judgment on the work. He ſpoke of it as he ought, and as it deſerves. Since la Caille, other travellers have given their opinions of Kolben; and the learned now know how far they may rely on the accounts of that traveller. To liſten to him, in all the Hottentot tribes without exception, mothers have the inhuman prejudice of reſolving not to have twins, and the abominable cuſtom of deſtroying one of the two. If the twins conſiſt of two boys, or two girls, they kill the weaker of the two; if a boy and girl, the girl, he ſays, is the victim; and he bluſhes not to avow, that he has witneſſed theſe crimes.

Now I aver, that this charge is the blackeſt calumny againſt nature that ever defiled the pen of a writer deſtitute of modeſty. The ſight of the two twins of one of the wives of the chief was ſufficient to convince me of this. However, as theſe children might have been an exception to the general law for ſome particular reaſon, I reſolved to interrogate their father reſpecting this pretended maſſacre. Every morning before I went a-hunting, he came to ſee me with his two wives, and regale himſelf with a pipe of tobacco and a *ſopje*, or ſmall glaſs, of brandy. Though his language was different from that of the Hottentots on the weſtern coaſt, yet, in the two months I had ſpent in the country, I had learned to underſtand it a little, and make myſelf underſtood.

One day, as I was ſitting on the graſs, near my tent, with him and his two wives, I turned the converſation to the ſubject of the twins, and aſked his wife whether, if ſhe ſhould have twins again, ſhe would not deſtroy one of them? This queſtion appeared to offend her: ſhe kept ſilence, and fell into a deep muſing. But her huſband, turning towards me, and reminding me that I had ſeveral times aſked him ſimilar queſtions, declared with warmth, that ſuch a ſacrifice

a sacrifice was impossible. Thus we see how unjust are the whites who, believing Kolben, accuse the Nimiquas of a crime so abominable as to be an outrage against the common mother of all beings. I will here add, that the Nimiquas not only do not make away with one of their twins when they have them, but preserve and bring up all their children. This duty is so natural, that I could not have made them comprehend an idea repugnant to it.

Besides the grand and revolting charge of which I have just spoken, I had heard, respecting the Greater Nimiquas, another absurd fable, the falsehood of which I equally verified. This was not told me at the Cape, like the preceding one: I had it from Klaas Baster, who, being born near Orange River, might have known some things respecting these people with certainty. According to him, the fathers, to shew what affection they bear their children, feed their eldest in a particular manner, as being of right the first object of paternal care. For this purpose, they put him in a coop, as it were: that is, they shut him up in a trench made under their hut, where, being deprived of motion, he loses little by perspiration, while they feed and cram him in a manner with milk and grease. By degrees the child fattens, and gets as round as a barrel; and when he is come to such a state as not to be able to walk, but to bend under his own weight, the parents exhibit him to the admiration of the horde; who, from that period, conceive more or less esteem and consideration for the family, according as the monster has acquired more or less rotundity. Such was the account given me by Klaas Baster; and, though it appeared to me altogether improbable, yet the narrator related so many particulars, of which he pretended to have been an eye-witness; he had so little interest in imposing upon me; and the human mind, in uncultivated and ignorant nations, appears sometimes capable of such senseless customs and prejudices, that, notwithstanding my reluctance, I could not avoid believing it.

Soon, however, I was undeceived. Wherever I asked any questions on the subject, I saw that the people to whom I addressed myself were ready to laugh in my face. Still, as it appeared strange to me, that a man should talk of what he had seen, when he had in reality seen nothing; as it was possible, that the fable might have some foundation, without being true in all its particulars; I was willing to convince myself what could have given rise to it; and, every time I visited a horde, I took care, under different pretences, to examine, one after another, all the huts of the kraal, and to ask which was the eldest child of the family: but I no where saw any thing that indicated either this pretended coop, or this pretended cramming.

It is probable that such a tale may have originated among the planters residing on the Namero, and in the neighbourhood of the country of the Nimiquas; that it was a pleasantry of some wit of the place on the leanness of these people, which indeed is extreme; and that Klaas Baster, the son of a Hottentot and a planter, having had it instilled into him in his infancy, had finished, like other romancers, by asserting that he had seen what he had only been told. And thus it is, that, throughout the whole of the colony of the Cape, the planters and even the Hottentots will assure you, that sprinkling with urine is practised in the marriage ceremonies of the savage hordes.

In size, the Greater Nimiquas are taller than the other Hottentot tribes. They appear even to exceed in height the Gonaquas, though perhaps

perhaps they do not reality. Their ſlender bones, delicate air, thin ſhape, and ſmall legs, every thing, in ſhort, even to their cloaks, which reach from their ſhoulders to the ground, contributed to the illuſion. On ſeeing the bodies of theſe men as ſlender as the ſtem of a tree, you would almoſt ſuppoſe them to have paſſed through the inſtrument of a wire-drawer. Leſs deep in colour than the Caffres, they have at the ſame time more pleaſing features than the other Hottentots, becauſe their noſe is leſs flattened, and their cheeks leſs prominent. But their cold and unmeaning countenances, their phlegmatic and immoveable air, give them a particular character by which they are diſtinguiſhed. Every time I looked at them, I fancied I beheld one of thoſe lank, long-viſaged, gothic figures placed at the church-doors in certain catholic countries as if to ſerve as ſentinels.

I have already ſaid, that the women do not ſhare this tranquil apathy. Gay, lively, ſportive, and loving much to laugh, you would ſuppoſe them to be formed of different materials. It is eaſy enough to conceive, that a man and wife may live peaceably together, notwithſtanding ſuch difference of diſpoſition; but it is not eaſy to underſtand or explain how ſuch melancholy fathers can beget daughters ſo gay, or ſuch ſprightly women bear ſons ſo dull.

The kroſs differs not at all in ſhape from the Hottentot cloak; only, as I have before remarked, it is longer. Many of them uſe the ſkins of the hyæna, the jackal, or the iſatis, when they are lucky enough to procure a ſufficiency to make a kroſs. They ornament them with glaſs beads, and plates of copper, which they obtain from the Hottentots of the colony. I found among them a particular ſort of theſe beads, conſiſting of little long tubes of different colours, and tranſparent. Theſe being unknown at the Cape, I wiſhed to know whence the ſavages procured them. They informed me, that they got them by barter with other neighbouring nations, who had them only at the ſecond hand; and, that they came originally from the blacks who dwelt on the coaſt of the Indian ſea, to the eaſt of Africa, by whom they were fabricated.

If the beads of which I am ſpeaking were ſtones or gems coloured by nature, it might be believed that the blacks of the weſt, after having reduced them to little pieces, might know how to ſhape and perforate them; as the ſavages of Guiana do with the amazonian ſtone. I have found coloured ſubſtances in ſeveral rocks on the weſt of Africa, and there may be the ſame on the eaſt. But theſe in queſtion are enamels; that is to ſay, glaſs, made by fuſion and formed by blowing. Now as ſuch an operation requires, not only for the melting, but alſo for the compoſition of the colours, conſiderable ſkill, implements, chemical knowledge, &c. I think it may be affirmed, without any great raſhneſs, that the negroes of the eaſt were never maſters of ſuch an art; and, that the enamels they ſell to their neighbours probably come from the Portugueſe colonies of Moſambique. I have in my cabinet one of theſe girdles of glaſs beads, and I can aſſert that it is neither of French nor Dutch manufacture.

Beſides the kind of decoration which I have juſt deſcribed, the Greater Nimiquas uſe another, that of daubing their hair with a thick layer of greaſe, mingled with the powder of different odoriferous woods. Many of them tattoo their faces, arms, and even bodies. But the latter cuſtom is not ſo prevalent among them, as among

among other people more to the north. This too may be a native custom, which the same spirit of coquetry that gave rise to it in other nations may have equally prompted the Nimiquas to invent.

As to religion, divine worship, priests, temples, and the idea of an immortal soul, they are all non-entities to them. On these subjects, like all the rest of the savages their neighbours, they have not the slightest notion. Nature has told them sufficiently plain, not to do to another what they would not another should do to them; and their little associations, which are a commencement of civilization, lead them in this respect farther than many cultivated people, by enjoining them to do to others as they would be done by.

After what I have said of the phlegmatic temper of the Nimiquas, it will be supposed that they are by no means warlike. Yet, like the surrounding nations, they have their assagays and poisoned arrows; and, like them can handle these arms with dexterity. They possess also those war-oxen, so formidable in battle, and so favourable to the cowardice or inactivity of the combatants. They have even a peculiar implement of war which their neighbours have not. This is a large buckler, of the height of the person who bears it, behind which the Nimiqua can completely conceal himself. But, besides that his natural apathy prevents him from giving or taking offence, he is in reality pusillanimous and cowardly from the coldness of his disposition. To utter only the name of Houzouana before him is sufficient to make him tremble. This name is that of a neighbouring nation, born brave and warlike, and distinguished from other African nations by peculiar features.

Notwithstanding his frigidity, the Nimiqua is not insensible to pleasure. He even seeks with avidity those which, requiring but little exertion, are capable of agitating him and procuring agreeable sensations. Every evening, as soon as the fire was kindled in my camp, thirty or forty persons, men and women, would come and sit with my people in a circle round it. For some time a profound silence was maintained: at length one of them would open his mouth to relate a story, and would then speak without ceasing for hours together. I was not sufficiently acquainted with the language to comprehend the whole of the narration, but I understood, that it commonly related to some event to the honour of the nation, and that the unfortunate hero of the tale was almost always a hyæna, a lion, or a Houzouana. Every now and then, the orator was interrupted by the noisy sallies of the women, who shook their very sides with laughter. The men, without taking any share in this extravagant mirth, reasoned gravely, and with an appearance of profound thought, on the circumstances they had just heard. In the midst of this grotesque and incongruous picture, I amused myself with the dignity of the reasoners; while the women, who saw me smile, and knew that I understood so little of the tale, redoubled their laughter till they were out of breath.

Their musical instruments are the same as those of the other Hottentots; but their dancing is very different, and resembles the temper of the nation. If the countenance have received from nature, features that can express our passions, the body has also its attitudes and movements that paint our temper and feelings. The dance of the Nimiqua is frigid, like himself, and so devoid of grace and hilarity,

larity, that, were it not for the extreme gaiety of the women, it might be called the dance of the dead. These tortoises, to whom dancing is a fatigue, shew little eagerness for any thing but wagers, games of calculation and chance, and all the sedentary amusements which require patience and reflection, of which they are more capable than they are of motion.

One of their favourite games is what they call the tiger and the lambs. It is nearly as follows: I say nearly, for I never understood it sufficiently to be able clearly to explain it. An oblong square is traced on the ground, in which are made a certain number of holes, two or three inches deep, forming a sort of chess-table. The holes are made in ranks, side by side, but the number is not fixed. I have seen them varying from twenty to forty. To play, they take a certain number of pieces of sheep's-dung, hardened by drying, proportionate to the number of holes, and which represent lambs. Some of the holes are also called lambs, and into these are put balls. The holes that remain empty, are called tigers. Perhaps they represent only different dens of the same animal, and the retreats or ambuscades which he occupies successively one after the other. The player begins by taking some lambs out of their holes, and putting them into other holes of the tiger. Perhaps this tiger has a regular movement like some of our pieces at chess, and the art of the player consists in avoiding this movement, to save his lambs, and prevent them from being devoured. At least, when it has been necessary to place them elsewhere, I have seen him double his attention; but he sometimes brings them together or separates them in such a confused manner, that, being unable to follow the game, I have been confounded by the movements, and could comprehend nothing farther, till the moment when the stakes were taken up.

There is another game, which, being much more easy, because it is simply a game of chance, is on that account so much the more dangerous; for the Nimiquas, fond of it to distraction, frequently risk, in playing at it, their herds and all they possess. It considerably resembles our hustle-cap. The seed of the mimosa of the country is a sort of bean, which constitutes the principal food of the giraffe. They take a certain number of these seeds, engrave some mark on one of their sides, which answers the same purpose to them that the head or the tale of a piece of money does to our gamblers, and, after they have hustled them some time between their two hands, they throw them on the ground, when they have nothing to do but to count whether the marked or unmarked sides uppermost are most numerous. This game, contrived equally to please the indolent, because it does not fatigue them, and the stupid, because it requires no capacity of thought, wonderfully delighted my Hottentots. They soon gave into it with such ardour, that they did nothing else from morning to night; and many of them, after having lost all they possessed, staked, as their last resource, the allowance of tobacco and brandy that they were to receive the succeeding days.— Nothing then was left for them but to rob me; and, I had reason to fear they would do so. To cut off the temptation, I re-established an equality of fortune among them, by restoring to each what he had lost, aware that the sole hope of regaining this makes gamblers; and I had then no need of proclamations to prevent in future such disorder in my camp.

Several

Several Nimiquas had accompanied me from the former horde to this; they appeared even to take pleaſure in being with me; but, the moment my people were prohibited from playing with them, they no longer found my camp ſo agreeable, and came to announce to me their departure. Nevertheleſs, as they had every reaſon to be ſatisfied with my conduct towards them, they expreſſed, on quitting me, great friendſhip and attachment; and, as I had juſt purchaſed ſome oxen for my waggons, they even offered to take them under their care, and deliver them to Swanepoel at my camp on the Orange River. This offer I accepted. In return, I made them a few preſents; I entruſted them with my cattle, after having marked them; and they went away ſatisfied.

Scarcely had they quitted me, when one of my Hottentos came to aſk a favour of me. He was deſirous of making one of the Nimiquas of the horde a preſent of a fine cow. He had already ſomething towards paying for her which he had gained at play: but he had not enough, and requeſted me to advance him, in part of his wages, a little hard-ware, that he might have it in his power to conclude his bargain. A gift of ſuch conſequence implied ſome great ſervice received. Before I aſſented to his requeſt, I would know what had given riſe to it; and I found that the cow was not a preſent, but an article of barter. My Hottentot was in love with the daughter of the Nimiqua: and, to obtain her, he had offered him a cow, which the Nimiqua had conſented to accept.

In this manner are marriages made in all the African nations; and ſuch was originally the cuſtom throughout the world, before the imagination of poets, and the policy of civilized ſocieties, had ſubſtituted in the ſtead of love a repreſentative, who, under the name of Hymen, claiming alone the right of uniting the ſexes, contributes but too often to diſturb and deprave their union. Among ſavages there is no contract, no witneſs, no ceremony. A man and woman pleaſe each other; they live together; and this conſtitutes them huſband and wife. If the woman have parents, ſhe is conſidered as their property, and of courſe they muſt either give or ſell her.

OF THE FORCE AND VARIETY OF SENTIMENT.

SENTIMENT, according to Lord Kames, is a term appropriated to ſuch thoughts as are prompted by paſſion. It differs from a perception; for a perception ſignifies the act by which we become conſcious of external objects. It differs from conſciouſneſs of an internal action, ſuch as thinking, ſuſpending thought, inclining, reſolving, willing, &c. And it differs from the conception of a relation among objects; a conception of that kind being termed *opinion.*

To talk in the language of muſic, each paſſion hath a certain tone, to which every ſentiment proceeding from it ought to be tuned with the greateſt accuracy: which is no eaſy work, eſpecially where ſuch harmony ought to be ſupported during the courſe of a long theatrical repreſentation. In order to reach ſuch delicacy of execution, it is neceſſary that a writer aſſume the preciſe character and paſſion of the perſonage repreſented; which requires an uncommon genius. But it is the only difficulty; for the writer, who, annihilating himſelf, can thus become another perſon, need be in no pain about the ſentiments that belong to the aſſumed character: theſe will flow without the

the leaſt ſtudy, or even preconception; and will frequently be as delightfully new to himſelf as to his reader. But, if a lively picture even of a ſingle emotion require an effort of genius, how much greater the effort to compoſe a paſſionate dialogue with as many different tones of paſſion as there are ſpeakers? With what ductility of feeling muſt that writer be endued, who approaches perfection in ſuch a work; when it is neceſſary to aſſume different and even oppoſite characters and paſſions in the quickeſt ſucceſſion? Yet this work, difficult as it is, yields to that of compoſing a dialogue in genteel comedy, exhibiting characters without paſſion. The reaſon is that the different tones of character are more delicate, and leſs in ſight, than thoſe of paſſion; and, accordingly, many writers, who have no genius for drawing characters, make a ſhift to repreſent, tolerably well, an ordinary paſſion in its ſimple movements. But of all works of this kind, what is truly the moſt difficult, is a characteriſtical dialogue upon any philoſophical ſubject; to interweave characters with reaſoning, by ſuiting to the character of each ſpeaker a peculiarity not only of thought but of expreſſion, requires the perfection of genius, taſte, and judgment.

How difficult dialogue-writing is, will be evident, even without reaſoning, from the miſerable compoſitions of that kind found without number in all languages. The art of mimicking any ſingularity in geſture or in voice, is a rare talent, though directed by ſight and hearing, the acuteſt and moſt lively of our external ſenſes: how much more rare muſt that talent be, of imitating characters and internal emotions, tracing all their different tints, and repreſenting them in a lively manner by natural ſentiments properly expreſſed? The truth is, ſuch execution is too delicate for an ordinary genius; and for that reaſon the bulk of writers, inſtead of expreſſing a paſſion as one does who feels it, content themſelves with deſcribing it in the language of a ſpectator. To awaken paſſion by an internal effort merely, without any external cauſe, requires great ſenſibility; and yet that operation is neceſſary, not leſs to the writer than to the actor; becauſe none but thoſe who actually feel a paſſion can repreſent it to the life. The writer's part is the more complicated: he muſt add compoſition to paſſion: and muſt, in the quickeſt ſucceſſion, adopt every different character. But a very humble flight of imagination may ſerve to convert a writer into a ſpectator, ſo as to figure, in ſome obſcure manner, an action as paſſing in his ſight and hearing. In that figured ſituation, being led naturally to write like a ſpectator, he entertains his readers with his own reflections, with cool deſcription, and florid declamation; inſtead of making them eye-witneſſes, as it were, to a real event, and to every movement of genuine paſſion. Thus moſt of our plays appear to be caſt in the ſame mould; perſonages without character, the mere outlines of paſſion, a tireſome monotony, and a pompous declamatory ſtyle.

This deſcriptive manner of repreſenting paſſion is a very cold entertainment; our ſympathy is not raiſed by deſcription; we muſt firſt be lulled into a dream of reality, and every thing muſt appear as paſſing in our ſight. Unhappy is the player of genius who acts a part in what may be termed a *deſcriptive tragedy*; after aſſuming the very paſſion that is to be repreſented, how is he cramped in action, when he muſt utter, not the ſentiments of the paſſion he feels, but a cold deſcription in the language of a byſtander? It is that imperfection,

fection, undoubtedly, in the bulk of our plays, which confines our ſtage almoſt entirely to Shakeſpeare, notwithſtanding his many irregularities. In our late Engliſh tragedies, we ſometimes find ſentiments tolerably well adapted to a plain paſſion: but we muſt not in any of them expect a ſentiment expreſſive of character; and, upon that very account, our late performances of the dramatic kind are for the moſt part intolerably inſipid.

But it may be proper to illuſtrate this ſubject by examples. The firſt examples ſhall be of ſentiments that appear the legitimate offſpring of paſſion; to which ſhall be oppoſed what are deſcriptive only, and illegitimate: and, in making this compariſon, the inſtances ſhall be borrowed from Shakeſpeare and Corneille, who for genius in dramatic compoſition ſtand uppermoſt in the rolls of fame.—Shakeſpeare ſhall furniſh the firſt example, being of ſentiments dictated by a violent and perturbed paſſion:

LEAR. ——————— Filial ingratitude!
Is it not as if this mouth ſhould tear this hand
For lifting food to't?—But I'll puniſh home;
No, I will weep no more.——In ſuch a night,
To ſhut me out!——Pour on, I will endure.
In ſuch a night as this! Oh! Regan, Gonerill,
Your old kind father, whoſe frank heart gave all—
Oh! that way madneſs lies; let me ſhun that;
No more of that.————
KENT. Good, my lord, enter here.
LEAR. Prithee, go in thyſelf, ſeek thine own eaſe,
This tempeſt will not give me leave to ponder
On things would hurt me more:—but I'll go in;
In, boy, go firſt. Yon houſeleſs poverty——
Nay, get thee in; I'll pray, and then I'll ſleep—
Poor naked wretches, whereſoe'er you are,
That bide the pelting of this pitileſs ſtorm!
How ſhall your houſeleſs heads, and unfed ſides,
Your loop'd and window'd raggedneſs, defend you
From ſeaſons ſuch as theſe!——Oh! I have ta'en
Too little care of this! take phyſic, Pomp;
Expoſe thyſelf to feel what wretches feel,
That thou may'ſt ſhake the ſuperflux to them,
And ſhew the heav'ns more juſt. LEAR, act iii. ſc. 5.

With regard to the French author, truth obliges us to acknowledge, that he deſcribes in the ſtyle of a ſpectator, inſtead of expreſſing paſſion like one who feels it; which naturally betrays him into a tireſome monotony, and a pompous declamatory ſtyle. It is ſcarcely neceſſary to give examples, for he never varies from that tone. We ſhall, however, take two paſſages at a venture, in order to be confronted with thoſe tranſcribed above. In the tragedy of Cinna, after the conſpiracy was diſcovered, Æmilia, having nothing in view but racks and death to herſelf and her lover, receives a pardon from Auguſtus, attended with the brighteſt circumſtances of magnanimity and tenderneſs. This is a lucky ſituation for repreſenting the paſſions of ſurpriſe and gratitude in their different ſtages, which ſeem naturally to be what follow. Theſe paſſions, raiſed at once to the utmoſt pitch, and being at firſt too big for utterance, muſt,

for ſome moments, he expreſſed by violent geſtures only: ſo ſoon as there is vent for words, the firſt expreſſions are broken and interrupted: at laſt, we ought to expect a tide of intermingled ſentiments, occaſioned by the fluctuation of the mind between the two paſſions. Æmilia is made to behave in a very different manner: with extreme coolneſs ſhe deſcribes her own ſituation, as if ſhe were merely a ſpectator; or rather the poet takes the taſk off her hands:

> Et je me rends, ſeigneur, à ces hautes bontés:
> Je recouvre la vue auprès de leurs clartés.
> Je connois mon forfait qui me ſembloit juſtice;
> Et ce que n'avoit pû la terreur du ſupplice,
> Je ſens naitre en mon ame un repentir puiſſant,
> Et mon cœur en ſecret me dit, qu'il y conſent.
> Le ciel a réſolu votre grandeur ſupreme;
> Et pour preuve, ſeigneur, je n'en veux que moi-même.
> J'oſe avec vanité me donner cet éclat,
> Puiſqu'il change mon cœur, qu'il veut changer l'état.
> Ma haine va mourir, que j'ai crue immortelle;
> Elle eſt morte, et ce cœur devient ſujet fidele;
> Et, prenant déſormais cette haine en horreur,
> L'ardeur de vous ſervir ſuccede à ſa fureur. Act v. ſc. 3.

So much in general upon the genuine ſentiments of paſſion. We proceed to particular obſervations. And, firſt, paſſions ſeldom continue uniform any conſiderable time: they generally fluctuate, ſwelling and ſubſiding by turns, often in a quick ſucceſſion; and the ſentiments cannot be juſt unleſs they correſpond to ſuch fluctuation. Accordingly, a climax never ſhews better than in expreſſing a ſwelling paſſion. The following paſſages may ſuffice for an illuſtration:

> ALMERIA. ———— How haſt thou charm'd
> The wildneſs of the waves and rocks to this;
> That thus relenting they have giv'n thee back
> To earth, to light and life, to love and me?
> MOURNING BRIDE, act i. ſc. 7.

> I would not be the villain that thou think'ſt
> For the whole ſpace that's in the tyrant's graſp,
> And the rich earth to boot. MACBETH, act iv. ſc. 4.

The following paſſage expreſſes finely the progreſs of conviction:

> Let me not ſtir, nor breathe, leſt I diſſolve
> That tender, lovely form, of painted air,
> So like Almeria. Ha! it ſinks, it falls;
> I'll catch it e'er it goes, and graſp her ſhade.
> 'Tis life! 'tis warm! 'tis ſhe herſelf!
> It is Almeria! 'tis, it is my wife!
> MOURNING BRIDE, act ii. ſc. 6.

In the progreſs of thought our reſolutions become more vigorous as well as our paſſions:

> If ever I do yield or give conſent,
> By any action, word, or thought, to wed
> Another lord; may then juſt heav'n ſhow'r down, &c.
> MOURNING BRIDE, act i. ſc. 1.

And

And this leads to a second observation, that the different stages of a passion, and its different directions, from birth to extinction, must be carefully represented in their order; because otherwise the sentiments, by being misplaced, will appear forced and unnatural.—Resentment, for example, when provoked by an atrocious injury, discharges itself first upon the author: sentiments therefore of revenge come always first, and must in some measure be exhausted before the person injured think of grieving for himself. In the Cid of Corneille, Don Diegue, having been affronted in a cruel manner, expresses scarcely any sentiment of revenge, but is totally occupied in contemplating the low situation to which he is reduced by the affront:

O rage! o desespoir! o vieillesse ennemie!
N'ai-je donc tant vecu que pour cette infamie?
Et ne suis-je blanchi dans les travaux guerriers,
Que pour voir en un jour fletrir tant de lauriers?
Mon bras, qu'avec respect tout l'Espagne admire,
Mon bras, qui tant de fois a sauvé cet empire,
Tant de fois affermi le trone de son roi,
Trahit donc ma querelle, et ne fait rien pour moi!
O cruel souvenir de ma gloire passé!
Oeuvre de tant de jours en un jour effacée!
Nouvelle dignité fatale à mon bonheur!
Precipice élevé d'où tombe mon honneur!
Faut-il de votre eclat voir triompher le comte,
Et mourir sans vengeance, ou vivre dans la honte?
Comte, sois de mon prince à present gouverneur,
Ce haut rang n'admet point un homme sans honneur;
Et ton jaloux orgueil par cet affront insigne,
Malgré le choix du roi, m'en a su rendre indigne.
Et toi, de mes exploits glorieux instrument,
Mais d'un corps tout de glace inutile ornement,
Fer jadis tant à craindre, et qui, dans cette offense,
M'as servi de parade, et non pas de defense,
Va, quitte desormais le dernier des humains,
Passe pour me venger en de meilleures mains.

CID, act i. sc. 7.

These sentiments are certainly not the first that are suggested by the passion of resentment. As the first movements of resentment are always directed to its object, the very same is the case of grief. Yet, with relation to the sudden and severe distemper that seized Alexander bathing in the river Cydnus, Quintus Curtius describes the first emotions of the army as directed to themselves, lamenting that they were left without a leader, far from home, and had scarcely any hopes of returning in safety: their king's distress, which must naturally have been their first concern, occupies them but in the second place according to that author. In the Aminta of Tasso, Sylvia, upon a report of her lover's death, which she believed certain, instead of bemoaning the loss of her beloved, turns her thoughts upon herself, and wonders her heart does not break:

Ohime! ben son di sasso,
Poi che questa novella non m'uccide.

Act iv. sc. 2.

In

In the tragedy of Jane Shore, Alicia, in the full purpofe of deftroying her rival, has the following reflection :

> Oh Jealoufy ! thou bane of pleafing friendfhip,
> Thou worft invader of our tender bofoms ;
> How does thy rancour poifon all our foftnefs,
> And turn our gentle nature into bitternefs !
> See where fhe comes ! Once my heart's deareft bleffing ;
> Now my chang'd eyes are blafted with her beauty,
> Loathe that known face, and ficken to behold her.
>
> Act iii. fc. 1.

Thefe are the reflections of a cool fpectator. A paffion, while it has the afcendant, and is freely indulged, fuggefts not to the perfon who feels it any fentiment to its own prejudice : reflections like the foregoing occur not readily till the paffion has fpent its vigour.

A perfon fometimes is agitated at once by different paffions ; and the mind in that cafe, vibrating like a pendulum, vents itfelf in fentiments that partake of the fame vibration. This we give as a third obfervation :

> QUEEN. Would I had never trod this Englifh earth,
> Or felt the flatteries that grow upon it !
> Ye've angels faces, but heav'n knows your hearts.
> What fhall become of me now ? wretched lady !
> I am the moft unhappy woman living.
> Alas! poor wenches, where are now your fortunes ?
> [*To her women.*
> Shipwreck'd upon a kingdom, where no pity,
> No friends, no hope, no kindred, weep for me !
>
> HENRY VIII. act iii. fc. 1.

> OTHELLO. Oh devil, devil !
> If that the earth could teem with woman's tears,
> Each drop fhe falls would prove a crocodile.
> Out of my fight !
> DESDEMONA. I will not ftay t'offend you. [*Going.*
> LODOVICO. Truly, an obedient lady :
> I do befeech your lordfhip, call her back.
> OTH. Miftrefs.—— DES. My lord.
> OTH. What would you with her, fir ?
> LOD. Who, I, my lord ?
> OTH. Ay ; you did wifh that I would make her turn.
> Sir, fhe can turn, and turn, and yet go on ;
> And turn again. And fhe can weep, fir, weep ;
> And fhe's obedient : as you fay, obedient :
> Very obedient—proceed you in your tears—
> Concerning this, fir,—oh well-painted paffion !—
> I am commanded home—get you away,
> I'll fend for you anon.—Sir, I obey the mandate,
> And will return to Venice.——Hence, avaunt !
> [*Exit* Defdemona.
>
> OTHELLO, act iv. fc. 6.

> ÆMILIA. O my good lord, I would fpeak a word with you.
> OTHELLO. Yes, 'tis Æmilia.—By and by.—She's dead.
> 'Tis like fhe comes to fpeak of Caffio's death ;

The

The noiſe was high.—Ha! no more moving?
Still as the grave. Shall ſhe come in? wer't good?
I think ſhe ſtirs again—No—what's the beſt?
If ſhe come in, ſhe'll, ſure, ſpeak to my wife:
My wife! my wife! what wife? I have no wife;
Oh inſupportable? oh heavy hour! OTHELLO, act v. ſc. 7.

A fourth obſervation is, That nature, which gave us paſſions, and made them extremely beneficial when moderate, intended undoubtedly that they ſhould be ſubjected to the government of reaſon and conſcience. It is therefore againſt the order of nature, that paſſion in any caſe ſhould take the lead in contradiction to reaſon and conſcience: ſuch a ſtate of mind is a ſort of anarchy which every one is aſhamed of and endeavours to hide or diſſemble. Even love, however laudable, is attended with a conſcious ſhame when it becomes immoderate: it is covered from the world, and diſcloſed only to the beloved object:

Et que l'amour ſouvent de remors combattu
Paroiſſe une foibleſſe, et non une vertu. BOILEAU.

Oh! they love leaſt that let men know they love.
TWO GENTLEMEN OF VERONA, act i. ſc. 3.

Hence a capital rule in the repreſentation of immoderate paſſions, that they ought to be hid or diſſembled as much as poſſible. And this holds in an eſpecial manner with reſpect to criminal paſſions: one never counſels the commiſſion of a crime in plain terms; guilt muſt not appear in its native colours, even in thought; the propoſal muſt be made by hints, and by repreſenting the action in ſome favourable light. Of the propriety of ſentiment upon ſuch an occaſion, Shakeſpeare, in the Tempeſt, has given us a beautiful example, in a ſpeech by the uſurping Duke of Milan, adviſing Sebaſtian to murder his brother the King of Naples:

ANTONIO. ——————— What might,
Worthy Sebaſtian,—Oh! what might—no more.
And yet, methinks, I ſee it in thy face
What thou ſhouldſt be: the occaſion ſpeaks thee, and
My ſtrong imagination ſees a crown
Dropping upon thy head. Act ii. ſc. 2.

A picture of this kind, perhaps ſtill finer, is exhibited in King John, where that tyrant ſolicits (act iii. ſc. 5.) Hubert to murder the young Prince Arthur; but it is too long to be inſerted here.

As things are beſt illuſtrated by their contraries, we proceed to faulty ſentiments, diſdaining to be indebted for examples to any but the moſt approved authors. The firſt claſs ſhall conſiſt of ſentiments that accord not with the paſſion; or, in other words, ſentiments that the paſſion does not naturally ſuggeſt. In the ſecond claſs ſhall be ranged ſentiments that may belong to an ordinary paſſion, but unſuitable to it as tinctured by a ſingular character. Thoughts that properly are not ſentiments, but rather deſcriptions, make a third. Sentiments that belong to the paſſion repreſented, but are faulty as being introduced too early or too late, make a fourth. Vicious ſentiments expoſed in their native dreſs, inſtead of being concealed or

diſguiſed,

disguised, make a fifth. And in the last class shall be collected sentiments to no character nor passion, and therefore unnatural.

1. Of sentiments that are faulty by being above the tone of the passion, the following may serve as an example:

OTHELLO. ———————— O my soul's joy!
If after every tempest come such calms,
May the winds blow till they have waken'd death:
And let the labouring bark climb hills of seas
Olympus high, and duck again as low
As hell's from heaven? OTHELLO, act ii. sc. 6.

This sentiment may be suggested by violent and inflamed passion; but is not suited to the satisfaction, however great, that one feels upon escaping danger.

2. Instance of sentiments below the tone of the passion. Ptolemy, by putting Pompey to death, having incurred the displeasure of Cæsar, was in the utmost dread of being dethroned: in that agitating situation, Corneille makes him utter a speech full of cool reflection, that is in no degree expressive of the passion:

Ah! si je t'avois cru, je n'aurois pas de maitre,
Je serois dans le trône où le ciel m'a fait naitre;
Mais c'est une imprudence assez commune aux rois,
D'écouter trop d'avis, et se tromper au choix.
Le Destin les aveugle au bord du précipice,
Ou, si quelque lumiere en leur ame se glisse,
Cette fausse clarté dont il les eblouit
Le plonge dans une gouffre, et puis s'evanouit.
MORT DE POMPE'E, act iv. sc. 1.

3. Sentiments that agree not with the tone of the passion; as where a pleasant sentiment is grafted upon a painful passion, or the contrary. In the following instances, the sentiments are too gay for a serious passion:

No happier task these faded eyes pursue;
To read and weep is all they now can do.
ELOISA TO ABELARD, l. 47.
Heav'n first taught letters for some wretch's aid,
Some banish'd lover, or some captive maid:
They live, they speak, they breathe what love inspires,
Warm from the soul, and faithful to its fires;
The virgin's wish without her fears impart,
Excuse the blush, and pour out all the heart;
Speed the soft intercourse from soul to soul,
And waft a sigh from Indus to the pole. ID. l. 51.

These thoughts are pretty; they suit Pope, but not Eloisa.—Satan, enraged by a threatening of the angel Gabriel, answers thus:

Then when I am thy captive, talk of chains,
Proud limitary cherub; but ere then
Far heavier load thyself expect to feel
From my prevailing arm, though heaven's King
Ride on thy wings, and thou with thy compeers,
Us'd to the yoke, draw'st his triumphant wheels
In progress thro' the road of heav'n *star-pav'd*.
PARADISE LOST, b. 4.

The concluding epithet forms a grand and delightful image, which cannot be the genuine offspring of rage.

4. Sentiments too artificial for a serious passion. The first example is a speech of Percy expiring:

O Harry, thou hast robb'd me of my growth!
I better brook the loss of brittle life,
Than those proud titles thou hast won of me;
They wound my thoughts worse than thy sword my flesh.
But thought's the slave of life; and life, time's fool;
And time, that takes survey of all the world,
Must have a stop. FIRST PART OF HEN. IV. act v. sc. 9.

The sentiments of the Mourning Bride are for the most part no less delicate than just copies of nature: in the following exception the picture is beautiful, but too artful to be suggested by severe grief:

ALMERIA. O no! Time gives increase to my afflictions.
The circling hours, that gather all the woes
Which are diffus'd through the revolving year,
Come heavy laden with th' oppressive weight
To me; with me, successively, they leave
The sighs, the tears, the groans, the restless cares,
And all the damps of grief, that did retard their flight;
They shake their downy wings, and scatter all
The dire collected dews on my poor head;
Then fly with joy and swiftness from me. Act i. sc. 1.

In the same play, Almeria seeing a dead body, which she took to be Alphonso's, expresses sentiments strained and artificial, which nature suggests not to any person upon such an occasion:

Had they or hearts or eyes, that did this deed?
Could eyes endure to guide such cruel hands?
Are not my eyes guilty alike with theirs,
That thus can gaze, and yet not turn to stone?
—I do not weep! The springs of tears are dry'd,
And of a sudden I am calm, as if
All things were well; and yet my husband's murder'd!
Yes, yes, I know to mourn: I'll sluice this heart,
The source of woe, and let the torrent in. Act v. sc. 11.

Pope's Elegy to the Memory of an Unfortunate Lady, expresses delicately the most tender concern and sorrow that one can feel for the deplorable fate of a person of worth. Such a poem, deeply serious and pathetic, rejects with disdain all fiction. Upon that account, the following passage deserves no quarter; for it is not the language of the heart, but of the imagination indulging its flights at ease, and by that means is eminently discordant with his subject. It would be a still more severe censure, if it should be ascribed to imitation, copying indiscreetly what has been said by others;

What though no weeping loves thy ashes grace,
Nor polish'd marble emulate thy face?
What though no sacred earth allow thee room,
Nor hallow'd dirge be mutter'd o'er thy tomb?

Yet ſhall thy grave with riſing flow'rs be dreſt,
And the green turf lie lightly on thy breaſt:
There ſhall the morn her earlieſt tears beſtow,
There the firſt roſes of the year ſhall blow;
While angels with their ſilver wings o'erſhade
The ground, now ſacred by thy relics made.

5. Fanciful or finical ſentiments. Sentiments that degenerate into point or conceit, however they may amuſe in an idle hour, can never be the offspring of any ſerious or important paſſion. In the Jeruſalem of Taſſo, Tancred, after a ſingle combat, ſpent with fatigue and loſs of blood, falls into a ſwoon; in which ſituation, underſtood to be dead, he is diſcovered by Erminia, who was in love with him to diſtraction. A more happy ſituation cannot be imagined, to raiſe grief in an inſtant to its higheſt pitch; and yet, in venting her ſorrow, ſhe deſcends moſt abominably into antitheſis and conceit even of the loweſt kind:

E in lui verſò d'ineffìcabil vena
Lacrime, e voce di ſoſpiri miſta.
In che miſero punto hor qui me mena
Fortuna? a che veduta amara e triſta?
Dopo gran tempo i' ti ritrovo à pena
Tancredi, e ti riveggio, e non ſon viſta,
Viſta non ſon da te, benche preſente
Ti trovando ti perdo eternamente. CANTO xix. ſt. 105.

Armida's lamentation reſpecting her lover Rinaldo is in the ſame vicious taſte. Vid. canto xx. ſtan. 124, 125, 126.

QUEEN. Give me no help in lamentation,
I am not barren to bring forth complaints:
All ſprings reduce their currents to mine eyes,
That I, being govern'd by the wat'ry moon,
May ſend forth plenteous tears to drown the world,
Ah, for my huſband, for my dear lord Edward.
Richard III. act. ii. ſc. 2.

Jane Shore utters her laſt breath in a witty conceit:

Then all is well, and I ſhall ſleep in peace——
'Tis very dark, and I have loſt you now——
Was there not ſomething I would have bequeath'd you?
But I have nothing left me to beſtow,
Nothing but one ſad ſigh. Oh mercy, Heav'n! [*Dies.*] Act v.

Guilford to Lady Jane Gray, when both were condemned to die:

Thou ſtand'ſt unmov'd;
Calm temper ſits upon thy beauteous brow;
Thy eyes, that flow'd ſo faſt for Edward's loſs,
Gaze unconcern'd upon the ruin round thee,
As if thou had'ſt reſolv'd to brave thy fate,
And triumph in the midſt of deſolation.
Ha! ſee, it ſwells, the liquid cryſtal riſes,
It ſtarts in ſpite of thee——but I will catch it,
Nor let the earth be wet with dew ſo rich. JANE GRAY, act iv.

The

The concluding ſentiment is altogether finical, unſuitable to the importance of the occaſion, and even to the dignity of the paſſion of love.

Corneille, in his Examen of the Cid, anſwering an objection, That his ſentiments are ſometimes too much refined for perſons in deep diſtreſs, obſerves, that, if poets did not indulge ſentiments more ingenious or refined than are prompted by paſſion, their performances would often be low, and extreme grief would never ſuggeſt but exclamations merely. This is in plain language to aſſert, that forced thoughts are more agreeable than thoſe that are natural, and ought to be preferred.

The *ſecond* claſs is of ſentiments that may belong to an ordinary paſſion, but are not perfectly concordant with it, as tinctured by a ſingular character.

In the laſt act of that excellent comedy The Careleſs Huſband, Lady Eaſy, upon Sir Charles's reformation, is made to expreſs more violent and turbulent ſentiments of joy than are conſiſtent with the mildneſs of her character.

LADY EASY. O the ſoft treaſure! O the dear reward of long-deſiring love.—Thus! thus to have you mine, is ſomething more than happineſs; 'tis double life, and madneſs of abounding joy.

The following inſtances are deſcriptions rather than ſentiments, which compoſe a *third* claſs.

Of this deſcriptive manner of painting the paſſions, there is in the Hippolytus of Euripides, act v. an illuſtrious inſtance, viz. the ſpeech of Theſeus, upon hearing of his ſon's diſmal exit. In Racine's tragedy of Eſther, the queen, hearing of the decree iſſued againſt her people, inſtead of expreſſing ſentiments ſuitable to the occaſion, turns her attention upon herſelf, and deſcribes with accuracy her own ſituation:

Juſte ciel! tout mon ſang dans mes veines ſe glace. Act i. ſc. 3.

AMAN. C'en eſt fait. Mon orgueil eſt forcé de plier.
L'inexorable Aman eſt reduit à prier. ESTHER, act 3. ſc. 5.

ATHALIE. Quel prodige nouveau me trouble et m'embarraſſe?
La douceur de ſa voix, ſon enfance, ſa grace,
Font inſenſiblement à mon inimitié
Succeder —— Je ſerois ſenſible à la pitié? ATHALIE, act ii. ſc. 7.

TITUS. O de ma paſſion fureur deſeſperée! BRUTUS, act iii. ſc. 6.

What other are the foregoing inſtances but deſcribing the paſſion another feels?

The *fourth* claſs is of ſentiments expreſſed too early or too late.—Some examples mentioned above belong to this claſs. Add the following from Venice Preſerv'd, act 5. at the cloſe of the ſcene between Belvidera and her father Priuli. The account given by Belvidera of the danger ſhe was in, and of her huſband's threatening to murder her, ought naturally to have alarmed her relenting father, and to have made him expreſs the moſt perturbed ſentiments. Inſtead of which, he diſſolves into tenderneſs and love for his daughter, as if he had already delivered her from danger, and as if there were a perfect tranquility:

Canſt thou forgive me all my follies paſt!
I'll henceforth be indeed a father; never,
Never more thus expoſe, but cheriſh thee,
Dear as the vital warmth that feeds my life,
Dear as thoſe eyes that weep in fondneſs o'er thee:
Peace to thy heart.

Immoral ſentiments expoſed in their native colours, inſtead of being concealed or diſguiſed, compoſe the *fifth* claſs.—The Lady Macbeth, projecting the death of the king, has the following ſoliloquy:

———————— The raven himſelf's not hoarſe
That croaks the fatal entrance of Duncan
Under my battlements. Come, all you ſpirits
That tend on mortal thoughts, unſex me here,
And fill me from the crown to the toe, top full
Of direct cruelty; make thick my blood,
Stop up th' acceſs and paſſage to remorſe,
That no compunctious viſitings of nature
Shake my fell purpoſe. MACBETH, act i. ſc. 7.

This ſpeech is not natural. A treacherous murder was never perpetrated even by the moſt hardened miſcreant without compunction: and that the lady here muſt have been in horrible agitation, appears from her invoking the infernal ſpirits to fill her with cruelty, and to ſtop up all avenues to remorſe. But in that ſtate of mind it is a never-failing artifice of ſelf-deceit to draw the thickeſt veil over the wicked action, and to extenuate it by all the circumſtances that imagination can ſuggeſt: and, if the crime cannot bear diſguiſe, the next attempt is to thruſt it out of mind altogether, and to ruſh on to action without thought. This laſt was the huſband's method:

Strange things I have in head, that will to hand;
Which muſt be acted ere they muſt be ſcann'd. Act iii. ſc. 5.

The lady follows neither of theſe courſes, but in a deliberate manner endeavours to fortify her heart in the commiſſion of an execrable crime, without even attempting to colour it. This, we think, is not natural; we hope there is no ſuch wretch to be found as is here repreſented.

The laſt claſs comprehends ſentiments that are unnatural, as being founded to no character nor paſſion. Theſe may be ſubdivided into three branches: firſt, ſentiments unſuitable to the conſtitution of man, and to the laws of his nature; ſecond, inconſiſtent ſentiments; third, ſentiments that are pure rant and extravagance.

When the fable is of human affairs, every event, every incident, and every circumſtance, ought to be natural, otherwiſe the imitation is imperfect. But an imperfect imitation is a venial fault, compared with that of running croſs to nature. In the Hippolytus of Euripides, (act iv. ſc. 5.) Hippolytus, wiſhing for another ſelf in his own ſituation, "How much (ſays he) ſhould I be touched with his misfortune!" as if it were natural to grieve more for the misfortune of another than for one's own.

OSMYN. Yet I behold her—yet—and now no more.
Turn your lights inward, eyes, and view my thought;
So ſhall you ſtill behold her—'Twill not be.

O impotence

O impotence of ſight! mechanic ſenſe,
Which to exterior objects ow'ſt thy faculty,
Not ſeeing of election, but neceſſity.
Thus do our eyes, as do all common mirrors,
Succeſſively reflect ſucceeding images.
Nor what they would, but muſt; a ſtar or toad;
Juſt as the hand of chance adminiſters! MOURN. BRIDE, act ii. ſc. 8.

No man, in his ſenſes, ever thought of applying his eyes to diſcover what paſſes in his mind; far leſs of blaming his eyes for not ſeeing a thought or idea. In Moliere's *l'Avare*, (act iv. ſc. 7.) Harpagon, being robbed of his money, ſeizes himſelf by the arm, miſtaking it for that of the robber. And again he expreſſes himſelf as follows: "Je veux aller querir la juſtice, et faire donner la queſtion à toute ma maiſon; à ſervantes, à valets, à fils, à fille, et à moi auſſi." This is ſo abſurd as ſcarcely to provoke a ſmile, if it be not at the author.

Of the ſecond branch the following example may ſuffice:

———————— Now bid me run,
And I will ſtrive with things *impoſſible*,
Yea, get the better of them. JULIUS CÆSAR, act ii. ſc. 3.

Of the third branch, take the following ſamples. Lucan, talking of Pompey's ſepulchre:

———————— Romanum nomen, et omne
Imperium magno eſt tumuli modus. Obrue ſaxa
Crimine plena deûm. Si tota eſt Herculis Oete,
Et juga tota vacant Bromio Nyſeia; quare
Unus in Egypto Magno lapis? Omnia Lagi
Rura tenere poteſt, ſi nullo ceſpit nomen
Hæſerit. Erremus populi, cinerumque tuorum,
Magne, metu nullas Nili calcemus arenas. LIB. viii. 798.

Thus, in Rowe's tranſlation:

Where there are ſeas, or air, or earth, or ſkies,
Where'er Rome's empire ſtretches, Pompey lies.
Far be the vile memorial then convey'd!
Nor let this ſtone the partial gods upbraid.
Shall Hercules all Oeta's heights demand,
And Nyſa's hill for Bacchus only ſtand;
While one poor pebble is the warrior's doom
That fought the cauſe of liberty and Rome?
If Fate decrees he muſt in Egypt lie,
Let the whole fertile realm his grave ſupply,
Yield the wide country to his awful ſhade,
Nor let us dare on any part to tread,
Fearful we violate the mighty dead.

The following paſſages are pure rant. Coriolanus, ſpeaking to his mother,

What is this?
Your knees to me? to your corrected ſon?
Then let the pebbles on the hungry beach
Fillop the ſtars: then let the mutinous winds
Strike the proud cedars 'gainſt the fiery ſun:
Murd'ring impoſſibility, to make
What cannot be, ſlight work. CORIOLANUS, act v. ſc. 3.

CÆSAR. —— Danger knows full well,
That Cæsar is more dangerous than he.
We were two lions litter'd in one day,
And I the elder and more terrible. JULIUS CÆSAR, act ii. sc. 4.

VENTIDIUS. But you, ere love misled your wand'ring eyes,
Were sure the chief and best of human race,
Fram'd in the very pride and boast of nature,
So perfect, that the gods who form'd you wonder'd
At their own skill, and cry'd, A lucky hit
Has mended our design. DRYDEN, ALL FOR LOVE, act i.

Not to talk of the impiety of this sentiment, it is ludicrous instead of being lofty.

The famous epitaph on Raphael is not less absurd than any of the foregoing passages:

Raphael, timuit, quo sospite, vinci,
Rerum magna parens, et moriente mori.

Imitated by Pope, in his epitaph on Sir Godfrey Kneller:

Living, great Nature fear'd he might outvie
Her works; and dying, fears herself may die.

Such is the force of imitation; for Pope of himself would never have been guilty of a thought so extravagant.

BITE OF A RATTLE-SNAKE.

AS it so rarely happens that any person recovers from the bite of this terrible and destructive animal, we shall here present the reader with a very remarkable account of a gentleman who got over a calamity of this kind. The narrative is contained in a letter from Mr. J. Breintal, to Mr. Peter Collinson, F. R. S. (published in the Transactions,) dated Philadelphia, Feb. 10, 1746.

"On the 2d of last May, in the afternoon, I took a turn down to the river; and, returning home up the hill, as it was stony, sometimes I was ready to fall, so saved myself by my hands, and got safe very near the top; where either my foot slipt, or the stone under it gave way, and brought me down upon my knees, I laid my hand on a broad stone to stay myself; and, I suppose, the snake lay on the opposite side, and might be offended by some motion of the stone, so bit my hand in an instant; then slid under the stones, and sounded his rattles.

"I felt a sort of chilness when I heard the sound; because I had a constant thought, that, if ever I was bit, my life was at an end. I tore up the stones, resolving to slay my murderer: at last I found him, crushed his head to pieces with a stone, took him up in my left hand, and ran to my quarters, sucking the wound on my right hand as I went, and spitting out the poison. This kept it easy; but my tongue and lips became stiff and numb, as if they had been frozen. So getting quickly home, 'I am bit by a rattle-snake, (said I;) and there lies my murderer!' casting him down on the ground.

"All hands were busy in a minute; some for one thing, some another. The first thing applied was a fowl; his belly ript up, and put on my hand alive, like a gauntlet, and there tied fast. This drew out

out ſome of the poiſon; for immediately he ſwelled, grew black, and ſtunk. I kept my elbow bent, and my fingers up, to keep the poiſon from my arm. Next we procured ſome turmeric. This we bruiſed well, tops and roots; ſo made a plaiſter, and bound it round my arm, to keep the poiſon in the hand. My hand grew cold and numb, and now puft up on a ſudden, and grew furious: ſo I ſlit my fingers with a razor, and this gave ſome eaſe. I alſo ſlit my hand on the back, and cupped it, and drew out a quart or more of ugly poiſony ſlimy ſtuff. But my arm ſwelled for all we could do: then I got it tied ſo faſt, that all communication might be ſtopped with the body, that it ſeemed almoſt void of feeling; yet would it work, jump, writhe, and twiſt, like a ſnake in the ſkin, and change colours, and be ſpotted; and they would move to and fro upon the arm, which grew painful in the bone. Thus was it tied two days, and all things applied that could be got or thought on. At laſt, the aſhes of white aſh-bark, and vinegar, made into a plaiſter, and laid to the bite, drew out the poiſon apace.

"My tongue and lips ſwelled that night, but were not very painful, occaſioned only, I ſuppoſe, by ſucking the wound. The ſwelling of my arm being ſunk, till it was at leaſt half gone, we then untied it; but, in two hours, all my right ſide was turned black, yet ſwelled but little; nor was there any pain went along with that change of colour: I bled at the mouth ſoon after, and continued ſpitting blood and feveriſh four days.

"The pain raged ſtill in the arm, and the fever more violent; and by turns I was delirious for an hour or two. This happened three or four times; and, nine days being over, the fever abated, and I began to mend; but my hand and arm were ſpotted like a ſnake, and continued ſo all the ſummer. In the autumn my arm ſwelled, gathered, and burſt; ſo away went the poiſon, ſpots and all. Heaven be thanked for ridding me of ſuch a curſed adverſary."

PYROTECHNY; OR THE ART OF PREPARING ALL KINDS OF FIRE-WORKS.—Continued from p. 138.

OF WHEELS AND OTHER WORKS.

Single Vertical Wheels.

THERE are different ſorts of vertical wheels; ſome having their fells of a circular form, others of an hexagon, octagon, or decagon, form, or any number of ſides, according to the length of the caſes you deſign for the wheel: your ſpokes being fixed in the nave, nail ſlips of tin, with their edges turned up, ſo as to form grooves for the caſes to lie in, from the end of one ſpoke to another; then tie your caſes in the grooves head to tail, in the ſame manner as thoſe on the horizontal water-wheel, ſo that the caſes ſucceſſively taking fire from one another, will keep the wheel in an equal rotation. Two of theſe wheels are very often fired together, one on each ſide of a building; and both lighted at the ſame time, and all the caſes filled alike, to make them keep time together; which they will do if made by the following directions. In all the caſes of both wheels, except the firſt, on each wheel drive two or three ladles full of ſlow fire, in any part of the caſes; but be careful to ram the

ſame

ſame quantity in each caſe, and in the end of one of the caſes, on each wheel, you may ram one ladleful of dead-fire compoſition, which muſt be very lightly drove; you may alſo make many changes of fire by this method. Let the hole in the nave of the wheel be lined with braſs, and made to turn on a ſmooth iron ſpindle. On the end of this ſpindle let there be a nut, to ſcrew off and on; when you have put the wheel on the ſpindle, ſcrew on the nut which will keep the wheel from flying off. Let the mouth of the firſt caſe be a little raiſed. Vertical wheels are made from ten inches to three feet diameter, and the ſize of the caſes muſt differ accordingly; four-oz. caſes will do for wheels of 14 or 16 inches diameter, which is the proportion generally uſed. The beſt wood for wheels of all ſorts is a light and dry beech.

Horizontal Wheels, are beſt when their fells are made circular; in the middle of the top of the nave muſt be a pintle, turned out of the ſame piece as the nave, two inches long, and equal in diameter to the bore of one of the caſes of the wheel: there muſt be a hole bored up the center of the nave, within half an inch of the top of the pintle. The wheel being made, nail at the end of each ſpoke (of which there ſhould be ſix or eight) a piece of wood, with a groove cut in it to receive the caſe. Fix theſe pieces in ſuch a manner that half the caſes may incline upwards and half downwards, and that, when they are tied on, their heads and tails may come very near together; from the tail of one caſe to the mouth of the other carry a leader, which ſecure with paſted paper. Beſides theſe pipes, it will be neceſſary to put a little meal-powder inſide the paſted paper, to blow off the pipe, that there may be no obſtruction to the fire from the caſes. By means of theſe pipes the caſe will ſucceſſively take fire, burning one upwards and the other downwards. On the pintle fix a caſe of the ſame ſort as thoſe on the wheel; this caſe muſt be fired by a leader from the mouth of the laſt caſe on the wheel, which caſe muſt play downwards: inſtead of a common caſe in the middle, you may put a caſe of Chineſe fire, long enough to burn as long as two or three of the caſes on the wheel. Horizontal wheels are often fired two at a time, and made to keep time like vertical wheels, only they are made without any ſlow or dead fire; 10 or 12 inches will be enough for the diameter of wheels with ſix ſpokes.

Spiral Wheels, are only double horizontal wheels, and made thus: —The nave muſt be about ſix inches long, and ſomewhat thicker than the ſingle ſort; inſtead of the pintle at top, make a hole for the caſe to be fixed in, and two ſets of ſpokes, one ſet near the top of the nave, and the other near the bottom. At the end of each ſpoke cut a groove wherein you tie the caſes, there being no fell; the ſpokes ſhould not be more than 3½ inches long from the nave, ſo that the wheel may not be more than 8 or 9 inches diameter; the caſes are placed in ſuch a manner, that thoſe at top play down, and thoſe at bottom play up, but let the third or fourth caſe play horizontally. The caſe in the middle may begin with any of the others you pleaſe: ſix ſpokes will be enough for each ſet, ſo that the wheel may conſiſt of twelve caſes, beſides that on the top: the caſes ſix inches each.

Plural Wheels, are made to turn horizontally, and to conſiſt of three ſets of ſpokes, placed ſix at top, ſix at bottom, and four in the middle, which muſt be a little ſhorter than the reſt: let the diameter of

of the wheel be ten inches; the cases must be tied on the ends of the spokes in grooves cut on purpose, or in pieces of wood nailed on the ends of the spokes, with grooves cut in them as usual: in clothing these wheels, make the upper set of cases play obliquely downwards, the bottom set obliquely upwards, and the middle set horizontally. In placing the leaders, you must order it so that the cases may burn thus, viz. first up, then down, then horizontal, and so on with the rest. But another change may be made, by driving in the end of the 8th case two or three ladlefuls of slow fire, to burn till the wheel has stopped its course; then let the other cases be fixed the contrary way, which will make the wheel run back again: for the case at top you may put a small gerbe; and let the cases on the spokes be short, and filled with a strong brilliant charge.

Illuminated Spiral Wheels.—First have a circular horizontal wheel made two feet diameter, with a hole quite through the nave; then take three thin pieces of deal, three feet long each, and $\frac{3}{4}$ of an inch broad each: one end of each of these pieces nail to the fell of the wheel, at an equal distance from one another, and the other end nail to the block with a hole in its bottom, which must be perpendicular with that in the block of the wheel, but not so large. The wheel being thus made, have a hoop planed down very thin and flat; then nail one end of it to the fell of the wheel, and wind it round the three sticks in a spiral line from the wheel to the block at top: on the top of this block fix a case of Chinese fire; on the wheel you may place any number of cases, which must incline downwards, and burn two at a time. If the wheel should consist of ten cases, you may let the illuminations and Chinese fire begin with the second cases. The spindle for this wheel must be a little longer than the cone, and made very smooth at top, on which the upper block is to turn, and the whole weight of the wheel to rest.

Double Spiral Wheel.—For this wheel the block, or nave, must be as long as the height of the worms, or spiral lines, but must be made very thin, and as light as possible. In this block must be fixed several spokes, which must diminish in length, from the wheel to the top, so as not to exceed the surface of a cone of the same height. To the ends of these spokes nail the worms, which must cross each other several times: these worms clothe with illuminations, the same as those on the single wheels; but the horizontal wheel you may clothe as you like. At top of the worm place a case of spur-fire, or an amber light.

Balloon Wheels, are made to turn horizontally: they must be made two feet diameter, without any spokes; and very strong, with any number of sides. On the top of a wheel range and fix in pots, three inches diameter and seven inches high each, as many of these as there are cases on the wheel: near the bottom of each pot make a small vent; into each of these vents carry a leader from the tail of each case; some of the pots load with stars, and some with serpents, crackers, &c. As the wheels turn, the pots will successively be fired, and throw into the air a great variety of fires.

Fruiloni Wheels.—First have a nave made nine inches long, three in diameter: near the bottom of this nave fix eight spokes, with a hole in the end of each, large enough to receive a two or four ounce case: each of these spokes may be 14 inches long from the block. Near the top of this block fix eight more of the same spokes, exactly

over the others, but not fo long by two inches. As this wheel is to run horizontally, all the cafes in the fpoke muft play obliquely upwards, and all thofe in the fpokes at bottom obliquely downwards. This being done, have a fmall horizontal wheel made with eight fpokes; each five inches long from the block: on the top of this wheel place a cafe of brilliant fire: all the cafes on this wheel muft play in an oblique direction downwards, and burn two at a time, and thofe on the large wheel four at a time; that is, two of thofe in the top fet of fpokes, and two of thofe in the bottom fet of fpokes.

The four firft cafes on the large wheel, and the two firft on the fmall, muft be fired at the fame time, and the brilliant fire at top at the beginning of the laft cafes. The cafes of the wheels may be filled with a grey charge. When thefe wheels are completed, you muft have a ftrong iron fpindle, made four feet fix inches long, and fixed perpendicularly on the top of a ftand: on this put the large wheel, whofe nave muft have a hole quite through from the bottom to the top. This hole muft be large enough to turn eafy round the bottom of the fpindle, at which place there muft be a fhoulder, to keep the wheel from touching the ftand: at the top of the fpindle put the fmall wheel, and join it to a large one with a leader, in order that they may be fired both together.

Cafcades of Fire.—The top piece of the cafcade may be of any length, fo as to hold the cafes at a little diftance from each other; all the crofs pieces are fixed horizontally, and fupported by brackets; the bottom crofs piece fhould be about one foot fix inches broad in the middle, the fecond one foot, the third nine inches, and the top piece four inches: the cafes may be made of any length, but muft be filled with a brilliant charge. On the edges of the crofs pieces muft be nailed bits of wood, with a groove cut in each piece, large enough for a cafe to lie in. Thefe bits of wood are fixed fo as to incline downwards, and that the fire from one tier of cafes may play over the other. All the cafes being tied faft on, carry leaders from one to the other; and let there be a pipe hung from the mouth of one of the cafes, covered at the end with a fingle paper, which you burn to fire the cafcade.

The Fire-Tree.—To make a fire-tree, you muft firft have a piece of wood fix feet long, and three inches fquare; then at nine inches from the top, make a hole in the front, and in each fide; or, inftead of holes, you may fix fhort pegs, to fit the infide of the cafes. At nine inches lower, fix three more pegs; at one foot nine inches from thence, fix three pegs; at nine inches lower, fix three pegs; at nine inches from thence, fix three pegs, inclining downwards; but all the other pegs muft incline upwards; then at top place a four-inch mortar, loaded with ftars, rains, and crackers. In the middle of this mortar place a cafe filled with any fort of charge, but let it be fired with the other cafes: a brilliant charge will do for all the cafes; but the mortar may be made of any diameter, and the tree of any fize; and on it any number of cafes, provided they are placed in the manner defcribed.

Chinefe Fountains.—To make a Chinefe fountain, you muft have a perpendicular piece of wood feven feet long and $2\frac{1}{2}$ inches fquare. Sixteen inches from the top, fix on the front a crofs-piece one inch thick, and $2\frac{1}{2}$ broad, with the broad fide up: below this, fix three more pieces of the fame width and thicknefs, at fixteen inches from each

each other: let the bottom rail be five feet long, and the others of ſuch a length as to allow the fire-pumps to ſtand in the middle of the intervals of each other. The pyramid being thus made, fix in the holes made in the bottom rail five fire-pumps, at equal diſtances; on the 2d rail, place four pumps; on the 3d, three; on the 4th, two; and on the top of the poſt, one; but place them all to incline a little forwards, that, when they throw out the ſtars, they may not ſtrike againſt the croſs rails. Having fixed your fire-pumps, clothe them with leaders, ſo that they may all be fired together.

Of illuminated Globes with horizontal Wheels.—The hoops for theſe globes may be made of wood, tin, or iron wire, about two feet diameter. For a ſingle globe take two hoops, and tie them together, one within the other, at right angles; then have a horizontal wheel made, whoſe diameter muſt be a little wider than the globe, and its nave ſix inches long; on the top of which the globe is fixed, ſo as to ſtand three or four inches from the wheel: on this wheel you may put any number of caſes, filled with what charge you like; but let two of them burn at a time: they may be placed horizontally, or to incline downwards, juſt as you chooſe. Now, when the wheel is clothed, fix on the hoops as many illuminations as will ſtand within $2\frac{1}{2}$ inches of each other: theſe you faſten on the hoops with ſmall iron binding wire; and, when they are all on, put on your pipes of communication, which muſt be ſo managed as to light them all with the ſecond or third caſe on the wheel. The ſpindle on which the globe is to run muſt go through the block of the wheel, up to the inſide of the top of the globe; where muſt be fixed a bit of braſs, or iron, with a hole in it to receive the point of the ſpindle on which the whole weight of the wheel is to bear, which repreſents a globe on its ſpindle. By this method may be made a crown, which is done by having the hoops bent in the form of a crown. Sometimes globes and crowns are ordered ſo as to ſtand ſtill, and the wheel only to turn round; but when you would have the globe or crown to ſtand ſtill, and the wheel to run by itſelf, the block of the wheel muſt not be ſo long, nor the ſpindle any longer than to juſt raiſe the globe a little above the wheel; and the wheel caſes and illumination muſt begin together.

Dodecaedron, ſo called becauſe it nearly repreſents a twelve-ſided figure, is made thus. Firſt have a ball turned out of ſome hard wood, fourteen inches diameter: when done, divide its ſurface into fourteen equal parts, from which bore holes $1\frac{1}{2}$ inch diameter, perpendicular to the centre, ſo that they may all meet in the middle: then let there be turned in the inſide of each hole a female ſcrew; and to all the holes but one, muſt be made a round ſpoke five feet long, with four inches of the ſcrew at one end to fit the holes; then in the ſcrew-end of all the ſpokes bore a hole, five inches up, which muſt be bored ſlanting, ſo as to come out at one ſide, a little above the ſcrew; from which cut a ſmall groove along the ſpoke, within ſix inches of the other end, where you make another hole through to the other ſide of the ſpoke. In this end fix a ſpindle, on which put a ſmall wheel of three or four ſides, each ſide ſix or ſeven inches long: theſe ſides muſt have groove cut in them, large enough to receive a two or four oz. caſe. When theſe wheels are clothed, put them on the ſpindles, and at the end of each ſpindle put a nut to keep the wheel from falling off. The wheels being thus fixed, carry

a pipe from the mouth of the firſt caſe on each wheel, through the hole in the ſide of the ſpoke, and from thence along the groove, and through the other hole, ſo as to hang out at the ſcrew-end about an inch. The ſpokes being all prepared in this manner, you muſt have a poſt, on which you intend to fire the work, with an iron ſcrew in the top of it, to fit one of the holes in the ball: on the ſcrew fix the ball; then in the top hole of the ball put a little meal-powder, and ſome looſe quick-match: then ſcrew in all the ſpokes; and in one ſide of the ball bore a hole, in which put a leader, and ſecure it at the end; and your work will be ready to be fired. By this leader the powder and match in the centre is fired, which will light the match at the ends of the ſpokes all at once, whereby all the wheels will be lighted at once. There may be an addition to this piece, by fixing a ſmall globe on each wheel, or one on the top wheel only. A grey charge will be proper for the wheel-caſes.

The Yew Tree of brilliant Fire.—Firſt, let there be an upright piece of wood, four feet long, two inches broad, and one thick: at top of this piece, on the flat ſide, fix a hoop fourteen inches diameter; and round its edge and front place illuminations, and in the centre a five-pointed ſtar; then at 1½ foot from the edge of the hoop, place two caſes of brilliant fire, one on each ſide: theſe caſes ſhould be one foot long each: below theſe fix two more caſes of the ſame ſize, and at ſuch a diſtance, that their mouths may almoſt meet them at top: then cloſe to the ends of theſe caſes fix two more of the ſame caſes; and they muſt ſtand parallel. The caſes being thus fixed, clothe them with leaders; ſo that they, with the illuminations and ſtars at top, may all take fire together.

Stars with Points for regulated Pieces, &c.—Theſe ſtars are made of different ſizes, according to the work for which they are intended: they are made with caſes from 1 oz. to 1 lb. but in general with 4 oz. caſes, four or five inches long: the caſes muſt be rolled with paſte, and twice as thick of paper as a rocket of the ſame bore. Having rolled a caſe, pinch one end of it quite cloſe: then drive in half a diameter of clay; and when the caſe is dry, fill it with compoſition, two or three inches to the length of the caſes with which it is to burn; at top of the charge drive ſome clay; as the ends of theſe caſes are ſeldom pinched, they would be liable to take fire. Having filled a caſe, divide the circumference of it at the pinched end cloſe to the clay into five equal parts; then bore five holes with a gimblet, about the ſize of the neck of a common four-oz. caſe, into the compoſition: from one hole to the other carry a quick-match, and ſecure it with paper: this paper muſt be put on in the manner of that on the ends of wheel-caſes, ſo that the hollow part, which projects from the end of the caſe, may ſerve to receive a leader from any other work, to give fire to the points of the ſtars. Theſe ſtars may be made with any number of points.

Fixed Sun with a tranſparent Face.—To make a ſun of the beſt ſort, there ſhould be two rows of caſes, which will ſhew a double glory, and make the rays ſtrong and full. The frame, or ſun-wheel, muſt be made thus:—Have a circular flat nave made very ſtrong, 12 inches diameter: to this fix ſix ſtrong flat ſpokes. On the front of theſe fix a circular fell, five feet diameter; within which fix another fell, the length of one of the ſun-caſes leſs in diameter; within this fix a third fell, whoſe diameter muſt be leſs than the ſecond by the length

length of one case and $\frac{1}{3}$. The wheel being made, divide the fells into so many equal parts as you would have cases (which may be done from 24 to 44): at each division fix a flat iron staple; these staples must be made to fit the cases, to hold them fast on the wheel; let the staples be so placed, that one row of cases may lie in the middle of the intervals of the other.

In the centre of the block of the sun drive a spindle, on which put a small hexagon wheel, whose cases must be filled with the same charge as the cases of the sun: two cases of this wheel must burn at a time, and begin with them on the fells. Having fixed on all the cases, carry pipes of communication from one to the other, and from one side of the sun to the wheel in the middle, and from thence to the other side of the sun. These leaders will hold the wheel steady while the sun is fixing up, and will also be a sure method of lighting both cases of the wheel together. A sun thus made is called a *brilliant sun*, because the wood work is entirely covered with fire from the wheel in the middle, so that there appears nothing but sparks of brilliant fire: but, if you would have a transparent face in the centre, you must have one made of pasteboard of any size. The method of making a face is, by cutting out the eyes, nose, and mouth, for the sparks of the wheel to appear through; but instead of this face, you may have one painted on oiled paper, or Persian silk, strained tight on a hoop: which hoop must be supported by three or four pieces of wire at six inches distance from the wheel in the centre, so that the light of it may illuminate the face. By this method you may have, in the front of a sun, Vivat Rex, cut in pasteboard, or Apollo painted on silk; but, for a small collection, a sun with a single glory, and a wheel in front, will be most suitable. Half-pound cases, filled ten inches with composition, will be a good size for a sun of five feet diameter; but, if larger, the cases must be greater in proportion.

Three Vertical Wheels illuminated, which turn on their own Naves upon a horizontal Table.—Let there be a deal table three feet in diameter: this table must be fixed horizontally on the top of a post; on this post must be a perpendicular iron spindle, which must come through the centre of the table: then let there be three spokes joined to a triangular flat piece of wood, in the middle of which make a hole to fit easily over the spindle: let there be pieces of wood, four or five inches long each, and two inches square, fixed on the under sides of the spokes; in these pieces make holes lengthwise to receive the thin part of the blocks of the wheels, which, when in, are prevented from coming out by a small iron pin being run through the end of each. Fix on three vertical octagon wheels, eighteen inches diameter each: the blocks of these wheels must be long enough for three or four inches to rest on the table; round which part drive a number of sharp points of wire, which must not project out of the blocks more than 1-16th of an inch: the use of these points is, that, when the blocks run round, they will stick in the table, and help the wheels forward: if the naves are made of strong wood, one inch will be enough for the diameter of the thin part, which should be made to turn easy in the holes in the pieces. On the front of the wheels make four or five circles of strong wire, or flat hoops, and tie on them as many illuminations as they will hold at two inches from each other: instead of circles you may make spiral lines,

clothed with illuminations, at the fame diftance from each other as thofe on the hoops. When illuminations are fixed on a fpiral line in the front of a wheel, they muft be placed a little on the flant, the contrary way that the wheel runs: the cafes for thefe wheels may be filled with any coloured charge, but muft burn only one at a time.

The wheels being thus prepared, you muft have a globe, crown, or fpiral wheel, to put on the fpindle in the middle of the table: this fpindle fhould be juft long enough to raife the wheel of the globe, crown, or fpiral wheel, fo high that its fire may play over the three vertical wheels: by this means their fires will not be confufed, nor will the wheels receive any damage from the fire of each other. In clothing this work, let the leaders be fo managed, that all the wheels may light together, and the illuminations after two cafes of each wheel are burned. *(To be continued.)*

DESCRIPTION OF ST. DOMINGO; ITS POPULATION, PRODUCE, &c.

THE poffeffions of the French in St. Domingo were divided into three great departments, called the Northern, the Weftern, and the Southern, provinces. The Northern province comprehends a line of fea-coaft extending about forty leagues, from the river Maffacre, to Cape St. Nicholas, and contained (including Tortuga) twenty-five parifhes. Its population, in the beginning of 1790, confifted of 11,996 white inhabitants of all ages, and 164,656 negro flaves. The number of fugar plantations was 288, of which 258 made what is called *clayed* or foft white fugar, and thirty *mufcovado* or new fugar. It reckoned 2,009 plantations of coffee, fixty-fix of cotton, 443 of indigo, and 215 fmall eftablifhments, fuch as provifion-polinks, cacao-groves, tan-pits, potteries, brick-kilns, &c.

Of the towns and harbours in the northern province, the chief were thofe of Cape François, Fort Dauphin, Port Paix, and Cape St. Nicholas. We fhall treat only of the firft and the laft.

The town of Cape François (which in time of war was feat of the French government) would have ranked among the cities of the fecond clafs, in any part of Europe, for beauty and regularity. It confifted of between eight and nine hundred houfes of ftone and brick, many of them handfome and commodious, befides fhops and warehoufes; and it contained two magnificent fquares, ornamented each with a public fountain. The chief public buildings were the church; the Jefuits' college, (converted after the revolution into a government-houfe, and place of meeting for the colonial and provincial affemblies;) a fuperb barrack for troops; a royal arfenal; a prifon; a play-houfe; and two hofpitals. The number of free inhabitants of all colours was eftimated at eight thoufand, exclufive of the king's troops and feafaring people. The domeftic flaves were faid to be about twelve thoufand. The fituation of the town, however, was not to be commended. It was built at the foot of a very high mountain, called Le Haut du Cap, which abounds indeed with fprings of excellent water, and furnifhed a great fupply of garden vegetables, but it ferved as a fcreen from the land wind, and reverberated the rays of the fun. The town arofe to opulence chiefly from the commodioufnefs of its harbour, and the extreme fertility of the plan adjoining it to the eaft, a diftrict fifty miles in length, and

and twelve in breadth, appropriated ſolely to the cultivation of ſugar, (the plantations of which were divided from each other only by hedges of citrons and limes,) and yielding greater returns than perhaps any other ſpot of the ſame extent in the habitable globe.

The town of Cape St. Nicholas conſiſts of two hundred and fifty houſes, which are chiefly built of American wood. It is ſituated at the foot of a high bluff, called the Mole; but, having been a free port, it was a place of conſiderable trade, and particularly reſorted to by the ſhips of America. It is chiefly known, however, for the ſafety and extent of its harbour, which is juſtly called the key of the windward paſſage; and the fortifications towards the ſea are reckoned among the ſtrongeſt in the Weſt Indies. On the ſide of the land they are overlooked by the ſurrounding heights, and hence it is concluded, that, although it might be difficult to take the place by an invading armament, it would be ſtill more difficult to retain it afterwards, unleſs poſſeſſion was obtained alſo of the interior country.

The weſtern province began at Cape St. Nicholas, and extending along the line of coaſt which forms the bight of Leogane, for upwards of one hundred leagues, terminated at Cape Tiburon. It contained fourteen pariſhes, and five chief towns, namely, Port au Prince, St. Marc, Leogane, Petit Goave, and Jeremie; beſides villages, of which thoſe of Gonaives, Arcahaye, and Croix des Bouquets, are not inconſiderable. The only good harbours in this great extent of coaſt are thoſe of Port au Prince and Gonaives. All the other ſhipping places are open roads, ſometimes much expoſed.

Port au Prince (except in time of war, when the governor-general was directed to remove to Cape François) was conſidered as the metropolis of the colony. It was deſtroyed by a dreadful earthquake on the 3d of June 1770, and had never been completely rebuilt. In 1790 it conſiſted of about ſix hundred houſes, and contained 2,754 white inhabitants. The ſituation is low and marſhy, and the climate, in conſequence, very unhealthy. It is ſurrounded moreover by hills, which command both the town and the harbour; but both the hills and the vallies are abundantly fertile. To the eaſt is ſituated the noble plain of Cul de Sac, extending from thirty to forty miles in length by nine in breadth, and it contained one hundred and fifty ſugar plantations, moſt of which were capable of being watered, in times of drought, by canals admirably contrived and diſpoſed for that purpoſe. The circumjacent mountains were at the ſame time clothed with plantations of coffee, which extended quite to the Spaniſh ſettlements.

The population and ſtate of agriculture in the weſtern province were as follow: White inhabitants of all ages 12,798; negroes in a ſtate of ſlavery 192,961; plantations of clayed ſugar 135, of muſcovado 222. Plantations of coffee 894, of cotton 489, of indigo 1952, beſides 343 ſmaller ſettlements.

The ſouthern province, extending upwards of ſixty leagues from Cape Tiburon, along the ſouthern coaſt of the iſland to l'Ance à Pitre, contained ten pariſhes, and two chief towns, Aux Cayes and Jacmel. It poſſeſſes no ſafe harbours, and its roads are dangerous. The ſhipping that load at Aux Cayes take refuge during the hurricane ſeaſon at La Baye des Flamands.

The population in this department was compoſed of 6,037 whites, and 76,812 negro ſlaves. Its eſtabliſhments conſiſted of thirty-eight plantations

plantations of white ſugar, and 110 of muſcovado; 214 coffee plantations, 234 of cotton, 765 of indigo, and 119 ſmaller ſettlements.

The quantity of land in cultivation throughout all the pariſhes was 763,923 carreaux, equal to 2,289,480 Engliſh acres, of which about two thirds were ſituated in the mountains; and, that the reader may have a ſtate of the agriculture at one view, we ſhall ſubjoin a ſummary of the preceding accounts, from whence it will appear that the French colony contained, the beginning of 1792,

	431	plantations of clayed ſugar,
	362	- of muſcovado.
Total	793	plantations of ſugar.
	3117	- of coffee,
	789	- of cotton,
	3160	- of indigo,
	54	- of cacao, or chocolate,
	623	ſmaller ſettlements, chiefly for raiſing grain, yams, and other vegetable food.
Making	8536	eſtabliſhments of all kinds throughout the colony.

The population in 1790, on a like ſummary, appears to have been, 30,831 whites of both ſexes and all ages (excluſive of European troops and ſea-faring people), and 434,429 negro ſlaves. In this account, however, the domeſtic ſlaves, and negro mechanics employed in the ſeveral towns, are not comprehended. They amounted to about 46,000, which made the number of negro ſlaves throughout the colony 480,000.

Of the free people of colour, no very accurate account was obtained. Monſ. Marbois, the intendant, reported them in 1787 at about, 20,000. In 1790, the general opinion fixed them at 24,000.

The exterior appearance of the colony, as we have obſerved in another place, every where demonſtrated great and increaſing proſperity. Cultivation was making rapid advances over the country. The towns abounded in ware-houſes, and the harbours were crowded with ſhipping. There were freighted, in 1787, 470 ſhips, containing 112,253 tons, and navigated by 11,220 ſeamen. The following is an account, from the intendant's reports, of the general exports, on an average, of the years 1787, 1788, and 1789; viz.

Average Exports from the French part of St. Domingo, before the Revolution.

	lbs.	Livres.
Clayed ſugar - -	58,642,214 - -	41,049,549
Muſcovado - -	86,549,829 -	34,619,931
Coffee - -	71,665,187 -	71,663,187
Cotton - -	6,698,858 -	12,397,726
	Hhds.	
Indigo - -	951,607 -	8,564,463
Molaſſes - -	23,061 -	2,767,320
An inferior ſort of rum called taffia	2,600 -	312,000
Raw hides - -	No. 6,500 -	52,000
Tanned ditto - -	No. 7,900 -	118,500

The total value at the ports of ſhipping, in livres of St. Domingo, was - - 171,544,666
being equal to 4,765,129l. ſterling money of Great Britain.

By

By this it will be found that the planters of Jamaica receive ſmaller returns from the labours of their negroes, in proportion to their numbers, than the planters of St. Domingo have received from theirs. For this difference various cauſes have been aſſigned, and advantages allowed, and qualities aſcribed to the French planters, which I venture to pronounce, on full enquiry, had no exiſtence. The true cauſe aroſe, undoubtedly, from the ſuperior fertility of the ſoil; and, above all, from the prodigious benefit which reſulted to the French planters from the ſyſtem of watering their ſugar lands in dry weather. This is an advantage which nature has denied to the lands in Jamaica, except in a very few places; but has freely beſtowed on many parts of St. Domingo, and the planters there availed themſelves of it with the happieſt ſucceſs.

On the 22d of May, 1798, it was determined by the commanding officer of the Britiſh forces at St. Domingo, (Brigadier general the Hon. Thomas Maitland,) to evacuate ſome of the places then in our poſſeſſion on that iſland, namely, the towns of Port au Prince and St. Marc's with their dependencies, together with the pariſh of Arcahaye; and this meaſure was carried into complete effect without the ſmalleſt loſs of any kind. He began on the 23d ult. to embark the heavy ſtores of every deſcription; ſtating a full determination to all the parties concerned, and ſending at the ſame time a flag of truce to General Touſſaint l'Ouverture, at Gonaives, leaving to his option, either to obtain the poſſeſſions we evacuated in a ſtate of ruin, or in a ſtate of perfect order, provided he would guarantee, in a ſolemn manner, the lives and properties of ſuch perſons as choſe to remain. General Touſſaint immediately agreed to the laſt propoſition, and ſent to Port au Prince on the 28th of April a confidential officer, who, having met Lieutenant-colonel Nightingale, deputy adjutant-general, on the 30th of April an agreement was mutually exchanged and ratified by both parties. The ſtipulation in favour of the inhabitants and planters afforded them a ſecurity with which they were ſo entirely ſatisfied, that, although at firſt they had univerſally reſolved to follow the king's forces, yet, upon hearing of this agreement in their favour, many of them who had actually embarked relanded, and there were not ten rich proprietors who ultimately, upon this occaſion, quitted their properties.

We proceed now to the enumeration of the different claſſes which form the entire population of St. Domingo: obſerving, by the way, that there is not a ſingle deſcendant to be found of the original inhabitants. The firſt then, is, of courſe, the white claſs. It comprehends the governor, the intendant, all the agents of government of every degree, the clergy, all the reſident proprietors, the managers, the attornies, and agents of the non-reſidents, the merchants, the ſoldiers, the retail dealers, the artiſts, and, finally, all the race of induſtrious labourers, whom the negroes call little whites; and whom want, ſhame, miſconduct, deſpair, and ſometimes the hopes of making a fortune, bring to a country of the world where living is the deareſt, where the induſtry has the feweſt channels, where arts are the leaſt honoured, and where the ill uſe which ſome of their predeceſſors made of the ancient and celebrated hoſpitality of the coloniſts, has rendered the inhabitants too circumſpect to admit into their houſes any but people well known, or well recommended. It was in conſequence of remonſtrances on the facility with which adventurers of all kinds

kinds paffed from Europe to the colonies, that the court made a regulation, which obliged every paffenger to appear with the captain of the veffel, and a furety, at the office of the admiralty of the port from which he propofed to embark.

This falutary law, however, like every other, is evaded; becaufe few captains refufed to pafs, as they call it, the firft vagabond who finds the art of interefting their pity, or the means of tempting their cupidity by a flight retribution. Whatever be the motive of fuch an action, it is at once a violation of the law, and a fpecies of robbery; fince fuch a paffenger muft live entirely on the fhip's ftores, and confequently at the expence of the merchants. But the agents of commerce long fince difcovered, in the principles which direct it, the juftification of thofe by which they believe themfelves exonerated from keeping too exact an account with probity.

The fecond clafs is that of the mulattos, quarterons, demi quarterons, or metis, and all, in fhort, who are called *people of colour*; amongft whom we place the free mulattos, proprietors of land, or living on their induftry; as well as the domeftics, free or flaves, of both fexes: for here the law comes to the fupport of opinion, and forbids the white to derogate from the dignity of his colour, by caufing himfelf to be ferved by a white! The following is an exact account of the progreffion of colour. The white and the female negro produce the mulatto; the mulatto and the female negro the *Grif*; the white and the female mulatto the *Quarteron*; the white and the female *Quarteron* the *Tierceron*; the white and the female *Tierceron* the *Métis*; the white and the female *Métis* the *Mamelouc*.

Originally every mulatto was free at the age of four-and-twenty; not in confequence of a pofitive law, but by the unanimous confent of the coloniifts. This regulation was extremely wife; as the vaft difproportion between the number of the blacks and the whites fhewed the neceffity of attaching the mulattoes to the latter. On the reprefentations, however, of fome of the planters, whofe calculations were deranged by the prohibition of felling their own flefh and blood, the king, by an edict dated in 1674, declared that the children fhould follow the condition of their mother! And I muft obferve, to the eternal fhame of the Europeans, that if a law which debafes them, by devoting their pofterity to flavery, is obferved with the moft rigorous exactnefs, it is not fo with another, which exprefsly ordains that every mafter fhall give each of his flaves two pounds and a half of falt meat a week.

The black clafs is the laft: it comprifes the free negroes who are proprietors of land, and by no means numerous; and the flaves, whether Creoles, that is, born in the colonies, or Boffales, imported from Africa.

Although the diftance between the flave and the free man be immenfe, yet, to avoid fubdivifions, and minute diftinctions, we have adopted the divifion of colour, as the moft fimple. For we muft farther obferve, that the male and female negroes as well as the male and female mulattos, in fpite of the acquifition of liberty, remain in a ftate of abjectnefs, which not only difqualifies them from any employ, but forbids them to contract with the whites a fufficient degree of intimacy, we will not fay to fleep with them, but even to eat. If you vifit a rich mulatto, he will call you fir, and not mafter, like the reft. You call him friend, dear friend, &c. he will afk you

to

to dinner, but, if he be correct, he will not presume to sit at table with you.

Such, is the total division. Each of the three classes has besides its shades—such as those which, in despite of complexion, separate the governor from the other whites, the mulatto from the free negro, &c. &c.

The compulsatory precautions arising from the prejudice of colour, have procured for the inhabitants two advantages, which in some degree compensate for the ridiculousness of it. They render the government more circumspect in its arbitrary proceedings; and they imprint on the colonists a character of haughty independence, from which despotic administrators have more than once experienced a resistance so inflexible, that the court has been finally obliged to recal a governor, whom the habit of playing the nabob in the East has daily tempted to transgress the bounds of his authority.

The natural consequence of the order of things which prevails here is, that all those titles of honour, which are elsewhere the *pabula* of emulation, of rivalry, and of discord; which inspire so much pride, and create so many claims in some; so much ambition and envy in others; shrink to nothing, and entirely disappear, before the sole title of White. It is by your skin, however branded it may be, and not by your parchment, however worm-eaten, that your pretensions to gentility are adjusted. Thus you see that vanity, which on your side of the water torments and turns herself a thousand ways, to impose on the public, and usurp the tribute of respect which it accords to the claims of birth, would here lose both her time and her labour.

Each of the different classes of the inhabitants of St. Domingo has, as you will readily imagine, a turn of thinking, a style of living, more or less approximate or distinct; which, after all, has little resemblance to what you will find elsewhere; because the climate, the regimen, the manners, the wants, the occupations, the degree of reciprocal dependency, establish here connections of the slightest nature; very different from those which, with you, bind together the members of the same society.

We might here seize the opportunity of entering into some details on this subject. As the study of man, however, in his moral capacity, requires more application, and more experience, than that of his existence in a social state; as the influence of the climate, and of a manner of living totally distinct from ours, acts necessarily on his character; and, finally, as too servile a regard to method would infallibly conduct us to a fatiguing monotony, we hold it to be the part of prudence not to hasten our judgment, and accumulate on one point observations, which, to be conclusive, should be result of time, comparison, and experience.

For example: the first thing that strikes every traveller who arrives here with the faculty of observation, is, that in spite of the conformity of origin, colour, and interests, the whites from Europe and the white Creoles form two classes, which, by their reciprocal pretensions, are so widely sundered, that necessity alone can bring them together. The former, with more breeding, more politeness, and more knowledge of the world, affect over the latter a superiority which is far from contributing to unite them. Yet, if the Creoles were a little more cautious than they are at present in their

too early connections with women; if they cultivated with more care their extraordinary propensities to excel in all bodily exercises; if they seconded by a better method of education the natural facility of their genius; we are persuaded that, not having to struggle against the influence of the climate under which they were born, nor against the habitudes of a kind of life differing essentially from that to which a European is obliged to submit himself on his arrival here, we are persuaded, that all the advantages would be on their side. Nothing is wanting to the Creole but a sufficient degree of good sense to enable him to use, without abusing, the faculties with which nature has endued him.

CULTIVATION OF THE OLIVE-TREE ABOUT GALLIPOLI.

THE olive-tree is here propagated, either by grafting, by slips, or by runners from the master roots, called in some places Barbatelle. They graft upon the wild olive, which abounds upon the pastures, where old and half-decayed trunks give reason to suppose that olive plantations formerly existed. This operation is performed between the end of March and the beginning of May; in three years fruit is produced, and this is the quickest method of producing it. The second mode is here called Culmonare. Between November and March, the branch of a bearing tree, from four to seven palms long, and from two to three inches thick, is slipped off, and put into a hole which had been dug some time before. The earth is then heaped up around the branch, within a foot of the top, in order that it may remain perfectly fresh; and in ten years it becomes a profitable tree. The third method, here called Mazarellare, consists in planting very small shoots, at a proper distance, in ground previously prepared. They are carefully watered during summer, and transplanted the third year; but it is only at the end of thirteen or fourteen years, that any real profit can be derived from such trees.

In the propagation of the olive-tree, less attention is paid to the quality of the olive than ought to be shewn to that article; for here, as amongst other kinds of fruit-trees, we shall find several varieties, especially if we are governed by their different appellations. But besides that, almost every town has its own peculiar term for one and the same sort; botanizers declare that the varieties are very trifling, although the nature of the climate, and the mode of cultivation, assuredly occasion some sort of distinction. It is certain, however, that the woods and uncultivated places produce a tree called by the peasantry Termete and Olivastro, which entirely corresponds with the Olea Europæa, and brings forth a great quantity of fruit, which is only half the size of that produced by an engrafted olive-tree. From these wild trees, when improved by cultivation, probably spring the numberless varieties which are to be found in this kingdom, and of which Dr. Presta mentions several in the quarto edition of his *Memoria intorno di Sessanti due saggi d'Oglio presentati alla Maestà del Re di Napoli*, published at Naples, in 1778. Amongst them he principally distinguishes only two kinds, called at Gallipoli, Ogliarola and Cellina; from whose fruit he extracted a dissimilar oil, although he at the same time allows the difference to be inconsiderable. The former corresponds with that which the ancients termed Salentina; and its fruit is by far the best in quality, as well as the most common

in the province; but the tree that bears it is ſubject to the blight, or bruſca. This olive is commonly nine lines long, ſix lines thick, ſomewhat curved, of a browniſh hue, and black when it is perfectly ripe: it weighs between thirty and forty grains, including the ſtone, which is almoſt ſmooth, and weighs about ſix or eight grains.

The other ſort, called Cellina, is, after the above, the moſt common; but it has many different appellations, as Uliva di Nardo, Caſcirolo, Miſciana, and others; and Columella is ſaid to mention it by the name of Oleaſtellum. This olive is commonly eight lines long, ſix broad, and has a very light ſtone. At firſt it appears as if covered with a ſilvery ſort of crape, but becomes quite black when it is ripe; it yields leſs than the foregoing, and the oil ſooner turns rancid. The tree which bears this olive, is now very generally cultivated, it being leſs ſubject to diſeaſes, and particularly to the bruſca.

The proceſs of cultivating the olive-tree conſiſts, firſt, in ſtirring the ground around the tree. This is done at the beginning of the year, when the earth is dug five or ſix feet around the trunk of the tree, to a certain depth, and ſome fine manure is put to the roots; but very judicious cultivators will not allow of the manure, and ſay that it is prejudicial to the quality of the oil. Only the trees upon the hills and fallow grounds are treated as above; the earth around thoſe upon the plains being ſufficiently ſtirred in the tillage of the land. Far more difficult is the next operation of pruning, which is beſt underſtood by the inhabitants of the environs of Taranto, and eſpecially by thoſe of Mazaſra, who are univerſally employed. Trees that do not ſhoot very faſt are pruned in December; and ſuch as are planted in a very rich ſoil, undergo that operation in the ſpring. The principal rule ſeems to be, to ſuffer but few centrical branches, to let in as much air as poſſible to the interior of the crown, and to form it more in breadth and rotundity than in height. But I doubt whether the true principles of pruning be underſtood here; and indeed, in ſome parts of this province, eſpecially near Lecce, the trees, being never pruned at all, attain a very unuſual height, and yield but very little fruit. Dr. Preſta tried the experiment of pruning and treating his trees like eſpaliers, with conſiderable ſucceſs.

The olive-trees uſually bloſſom in June. In October the fruit begins to ripen; but does not reach its full perfection until December, when the ſkin, the pulp, and the ſurface of the ſtone, become black. At that period they yield the beſt oil; and, although in many places the olives are ſeen hanging upon the trees until the beginning of April, it is extremely detrimental to the quality of the oil, if the olives are allowed to remain upon the trees later than the cloſe of December. Before the ſtone is hard, which takes place in Auguſt, no preſſure whatever can force any oil out of the fruit. Although green in October, they are quite ripe enough for the table; and in November they aſſume a reddiſh hue, but are ſtill too acrid to produce oil of the beſt quality. At that time, indeed, a certain ſort of oil, called Oglio Onfacino, is extracted from them, but is only uſed for particular purpoſes. According to Dioſcorides, Mat. Med. lib. 1. cap. 27. this oil was likewiſe prepared by the ancients, who knew how to give it a white colour, its natural one being a greeniſh yellow. It was by them conſidered as the beſt oil; but they muſt have poſſeſſed a method of preparing and colouring it, which is now loſt; for, notwith-

notwithstanding Dr. Presta has with infinite attention tried every method of making it, the oil has always turned sharp, and been of a greenish yellow colour. The Oleum strictivum of the ancients was prepared from olives, which, having attained a middle state of maturity, were neither green nor black, but spotted in a very particular manner. In some of the environs of Taranto, they wait until the olives fall to the ground, before they gather them; so that the harvest lasts from the end of October until the end of March. But at Taranto itself, where the management of this useful and profitable fruit is better understood, the olives are gathered in December with the greatest care, and heaped up in cellars, until it be convenient to press them. As very few individuals have an oil press, and as in the baronial towns the lord has generally the exclusive right of possessing one, of which his subjects are constrained to make use, they are frequently obliged to wait so long before they can extract their oil, that the olives necessarily fall into a state of too great fermentation, which is succeeded by putrefaction; and this is one of the principal causes of the general badness of the oil. The Duke of Martina has indeed constructed magazines for olives, arched over, and contiguous to his presses, upon one of his estates, called Casalerotto, where he has 900 moggie of olive plantations; and the olives are well preserved therein; but such expensive works can only be undertaken by very opulent proprietors.

The oil-mills, called Trappeti, are of two kinds; one which has been in common use for a long period of time; and another that was found in the overwhelmed town of Stabia, and has been improved by Lavegha. The first consists of a solid piece of lime-stone, or marble, fashioned like a mill-stone, seven palms in diameter, and two in thickness: this vertical sort of wheel is placed upright upon a round flat stone, from six to seven palms in diameter, which has a raised border, and is fixed upon a pedestal four palms high. From the bottom of this stone rises a moveable cylinder, from which an axle extends into the centre of the upright stone, in such a manner, that it can turn round, as in the nave of a wheel. An ass being harnessed to a bar, that stretches also from the cylinder across the wheel, gives motion both to the cylinder and the wheel, whose weight crushes the olives upon the stone beneath. The other machine, which was found under the ruins of Stabia, and has been improved and rendered fit for present use by Lavegha, consists of a round pedestal, four or five palms high, in which is fixed a concave hemisphere, of lava, or other very hard stone, two palms deep in the middle, and seven and a half in diameter, including the brim, which is one palm and a half broad. From the centre of this hemisphere rises a moveable cylinder, whose upper end is let into a cross beam, in which also it moves around. At a certain distance from the lower end, a very strong iron axle passes through the cylinder; upon each side of which a piece of lava, of an hemispherical form, is placed, so that the axle passes them far enough for nuts to be fixed at the ends of it, in such a manner, that the two segments may be moved at pleasure, to or from the cylinder. The convexity of these segments, which, when united, are four palms in diameter, exactly coincides with the concavity of the mortar, from which the segments can however be withdrawn by means of the nuts. In the space

ſpace between the ſegments are two iron inſtruments, of which one is inſerted in either ſtone; the one is in the form of a ſickle, and keep the olives under the ſegments; and the other ſcratches off the thick pulp that adheres to them. A hole is cut through one ſide of the concave ſtone, and furniſhed with a cork, which, when the olives are ſufficiently cruſhed, is drawn out, and the motion of the machine forces out the pulp, when freſh olives are thrown into the mill. The advantage of this oil-mill over the other, conſiſts in its requiring fewer hands, and in ſhortening the time of grinding. For, with the common machine, one man is conſtantly employed in replacing under the mill-ſtone ſuch olives as fall out, and in taking out the pulp, before he can put in freſh fruit. Somewhat leſs oil is perhaps produced by Lavegha's mill; but this defect is amply remedied by the ſuperior quality of the oil; for, as his mill poſſeſſes the peculiar advantage of cruſhing the olive without grinding the ſtone, the oil is free from that raw and acrid ſort of taſte, to which the oil produced from the other mill is but too ſubject. In ſhort, its numerous opponents can reproach it with nothing but being of more expenſive conſtruction; for their other objections, that it yields much leſs oil, and that their forefathers always made uſe of and were ſatisfied with the common one, can have but little weight with reaſonable people. And, with reſpect to the expence, it is indeed certain that the Duke of Martina expended a large ſum in the conſtruction of his mills at Caſalerotto, for which he cauſed the lava to be tranſported by ſea from the foot of mount Veſuvius to Taranto; but it is not neceſſary for every one to follow the example of that opulent noblemen, eſpecially when it is known that the neighbouring mountains of Calabria abound in ſtone as proper for the purpoſe as lava, &c. As ſoon as the olives are ſufficiently cruſhed, the pulp is put into a cylindrical ſort of ſtraw baſkets, called fiſchioli, placed one upon another, under a preſs that is worked by four or five men. When the oil has done running, warm water is thrown upon the baſkets, which undergo a ſecond preſſure. The oil is received either in wooden or earthen veſſels, out of which it is poured into a deep brick ciſtern, where it is uſually well preſerved.

CHARACTER OF THE REIGNING SULTAN, SELIM III.

SULTAN SELIM III. is the eldeſt male deſcendant of the houſe of Oſman, who in 1299 eſtabliſhed the fifth dynaſty of the kalifes. At the death of his father Muſtafa III. in 1775, he was fourteen years old. According to the known precedent amongſt the Turks, Abdul-hamid, his uncle, ſucceeded to the throne; for they diſdain to be governed either by a woman or a boy. At his acceſſion, Abdul-hamid had reached the age of forty-nine, and during the fifteen years reign of his brother Muſtafa had endured a ſtate of impriſonment, which the jealous policy of the ſeraglio had long ordained. As a ſolace of his confinement, he cultivated literature and the arts of peace. His diſpoſition, mild and beneficent, induced him to forego the ancient prejudice, and to ſuperintend the education of Sultan Selim, giving him every liberal indulgence. Sultan Muſtafa, and Sultan Mahmood, the ſons of Abul-hamid, and the only remaining heirs of the empire, are both minors. They experience a generous return for their father's kindneſs, and are treated with ſuitable

ſuitable reſpect. Each has his ſeparate ſuite of apartments, and ſixty attendants, amongſt whom are thirty elderly female ſlaves, with an annual revenue of 5000l. ſterling. The good muſſulman, who laments the poſſible extinction of the imperial family, is comforted by the aſtrologers, who have publicly declared, that, after he has attained to forty years, Sultan Selim will be bleſſed with a numerous progeny.

His countenance is handſome and impreſſive, and his figure good; he is affable, and poſſeſſes much ſpeculative genius, is not ill-informed of the characters and ſeparate intereſts of his contemporary princes, and has every inclination to reconcile his ſubjects to the ſuperior expediency of European maxims, both in politics and war. But it is dubious if he be capable of that energetic activity, and that perſonal exertion, which are required in an abſolute prince to re-model a people whoſe opinions are not to be changed but by an univerſal revolution. Peter the Great and Charles XII. in their plans of regenerating, or conquering their ſubjects, did not depend ſolely upon the agency of miniſters for ſucceſs.

The curioſity of Selim reſpecting the other nations of Europe, originated in frequent converſations with Rachìb Effendi, the preſent hiſtoriographer-royal, who was for ſome time envoy at Vienna, after the laſt war. Thoſe who have gained his confidence ſince the commencement of his reign, have conſulted that inclination, and improved every opportunity of extending his intelligence on thoſe ſubjects. I have heard it aſſerted, that the young men in the ſeraglio are now inſtructed in the French language by his command; and his partiality to French wine is no ſecret amongſt the well-informed. The firſt efforts towards improvement have been applied to the army and marine. Forts have been erected on the Boſphorus, regiments have been trained to European diſcipline, chiefly by French officers, and the fleet will become in a certain degree formidable.

When he has leiſure to render his vaſt territory, at leaſt in the vicinity of his capital, more reſemblant of civilized nations, he will probably eſtabliſh a poſt, which may facilitate communication between diſtant provinces. During the laſt war many places of importance were taken, or evacuated, weeks before the miniſtry were in poſſeſſion of the fact. The only imperial works now ſeen in his dominions are moſques, aqueducts, and fountains; he may hereafter turn his attention to great roads, now barely paſſable, which would be as uſeful monuments of his fame.

Mehmèt Mèlek Paſha, the late viſier, reſigned in 1794. He was a favourite, in his youth, of Muſtafa III. who gave him his ſiſter in marriage, and the appellation of Melèk, or the Angel, on account of his ſingular beauty; for the Turks uſually take their ſurname from ſome perſonal excellence or peculiarity. After having enjoyed ſome of the moſt lucrative governments in the empire, he returned to Conſtantinople, and was called to the viſirate, at the advanced age of ninety years, in 1789. He has retired to his palace on the Aſiatic ſide of the Boſphorus, and, as an extraordinary fact in natural hiſtory, has had a ſon born to him, whoſe legitimacy cannot be invalidated.

The preſent ſyſtem of government aims at the ſuppreſſion of the former ſole authority of the viſier, and has reduced him to a mere member of the cabinet council. As the ſultan takes a more active ſhare than his predeceſſor in public affairs, and liſtens to more adviſers, it ſeems to draw to an end. The viſier now in office is like-
wiſe

wife a harmlefs old man, fo that they may probably foon "fit ftate-ftatues only." The ruling perfons of the prefent day are, 1. Yufûf Agha, kiayah, or high-fteward to the fultan's mother, who retains a very decided influence with him. Yufûf's private life has been marked by uncommon circumftances. He is a native of Candia, and was originally a writer to a fhip, from which employment he paffed into the fervice of Abdullâh Pafha, beglerbey of Anatolia, refiding at Kutayah. During ten years he fo ingratiated himfelf with the pafha, that he determined to fecure to him his great wealth in his life-time. Accordingly he gave him entire poffeffion, ordering him to fly to the Porte and to urge the heavieft complaints againft him for his injuftice and ill-treatment. Meanwhile the pafha died. The Capidji bafhi was difpatched by the fultan to feize the treafure, but found nothing; and Yufûf, from the predicament in which he ftood, was the laft perfon to be fufpected. With this wealth he lived in fplendour at Conftantinople, and frequented the audiences of the vifier. He was foon appointed taraphanà eminy, or mafter of the mint, from which he was advanced to his prefent poft. 2. Ratîb Effendi has twice held the important office of reis-effendi, or fecretary of ftate. He rofe from a public clerk, paffing through all the preliminary gradations with diftinguifhed ability. He is beyond comparifon the beft-informed and moft capable minifter in the cabinet. 3. Tchiufèh, kiayah, or deputy to the vifier, is at the head of the finance, and planned the new taxes.

The prefent capudân pafha, or high admiral, called Kuchuk Huffein, from his diminutive ftature, was a Georgian flave, and the companion of the fultan in his childhood. From the feraglio he emerged to take the command of the navy, it may be prefumed without much previous acquaintance with maritime affairs. But his adminiftration has been very beneficial; for he has raifed the marine from the miferable ftate it was left in at the conclufion of the Ruffian war, to refpectability. The new fhips are built under the infpection of European furveyors, and French nautical terms have been adopted. At the beginning of the prefent century, the Turkifh fleet confifted of thirty-two fhips of the line, thirty-four galleys, and fome brigantines; they can now fend to fea fourteen firft rates, fix frigates, and fifty floops of war.

Every fpring he leaves Conftantinople with a few fhips, to vifit the Archipelago, to receive the capitation tax from the different iflands, and to free the feas from pirates, and the Maltefe cruifers. The time of his coming is generally known, fo that the fervice is little more than a matter of form. His reception by the fultan, both at his departure and return, is a brilliant fpectacle. He is married to the only daughter of Abdul hamid, and is honoured with the private friendfhip of his fovereign.

In 1784, a fchool of theoretical navigation was inftituted by the Vifier Hamid Halil Pafha, who was beheaded the next year.

Bofcovitz difcovered errors in the navigation of the Black Sea, by which fo many lives are annually loft; but no falutary reformation has taken place.

The firft idea of European fortifications was given to the Turks by Baron de Tott, who was employed to erect thofe at the Dardanelles, and at the mouth of the Bofphorus. Had his plans been adopted to their full extent, they would not have looked fo much

like card-boxes; but the Turks curtail all their national works by parſimony and jobbing.

Every ſcheme for defending the coaſt of the Black Sea, by forts and batteries, and for military regulations, is ſubmitted to Cheliby Effendi, who ſurveys their execution, if approved. He was maſter of the mathematical ſchool, founded in 1773 by Ghazi, Haſſan paſha, a very celebrated character in the laſt reign. This extraordinary perſon was, likewiſe, a Georgian ſlave, and afterwards a Barbary corſair. Having been taken priſoner by the Spaniards, he paſſed ſix years of ſlavery at Madrid, from whence he was ſent to Naples, where he was exchanged, and returned to Conſtantinople. His reputation for perſonal courage procured him the command of a galley, and afterwards of a frigate. At the unfortunate battle of Cheſhmè he had a ſhip of the line under Jaffer, capudan paſha, who upon his diſgrace died of chagrin, and was ſucceeded by Haſſan. He was extremely whimſical, and kept a lion's whelp always on his ſofa, which he had trained up to follow him, but which, having killed one of the domeſtics, was afterwards chained. He became viſier, and died at the age of more than ſeventy, in the camp againſt the Ruſſians, not without ſuſpicion of poiſon. So ſingular was his bravery, and ſo frequent his ſucceſſes, that he aſſumed the name of Ghazi the victorious. Abdul-hamid was fearful, and conſidered the ſafety of the empire endangered by his abſence from Conſtantinople.

Of his prevailing influence the following relation is a proof, and gives traits of ſecret machinations practiſed in the ſeraglio. One of his ſlaves, named Yuſuf, had ſo recommended himſelf by ſuperior talents, that he gave him liberty, and promotion to the moſt conſiderable offices. At the time Yuſuf returned from his government of the Morea, to take upon him the office of viſier, Mavro-yeni, a Greek of a noble family, was the dragoman, or interpreter, to his patron Haſſan. Petraki, another Greek, was maſter of the mint, and imperial banker, and had amaſſed ſeven millions of piaſtres.

This man being ambitious of becoming Prince of Wallachia, he three times procured the appointment of Mavro yeni to that high ſtation, who procured Haſſan and the viſier to be ſuperſeded. But they, impatient of the diſappointment, repreſented to Abdul-hamid, that the people demanded the life of Petraki in atonement of his peculation, who timidly conſented to his execution, and he was inſtantly impriſoned. On the very day of the high ceremony of Mavro yeni's inveſtiture, he was led to the gate of the ſeraglio to kiſs his ſtirrup, and ſue for pardon. At that inſtant the executioner ſtruck off his head, and Mavro-yeni had the ſatisfaction of ſeeing his rival dead at his feet. Another Haſſan paſha, who hated him, becoming viſier, ordered him to be beheaded upon the charge of betraying Giurgevow, the firſt Turkiſh fortreſs upon the Danube, to the Germans. He died a muſſulman. Abdul-hamid, when informed of the laſt-mentioned circumſtance, was ſo far convinced of his innocence, that in a few months the vindictive viſier ſhared the ſame fate.

PYROTECHNY; OR THE ART OF PREPARING ALL KINDS OF FIRE-WORKS.—Continued from p. 166.

ILLUMINATED WORKS.

ILLUMINATED works are much admired by the Italians, and indeed are a great addition to a collection of works: in a grand exhibition an illuminated piece ſhould be fired after every two or three wheels, or fixed pieces of common and brilliant fires; and likewiſe illuminated works may be made cheap, quick, and eaſy.

Illuminated Chandelier.—To make an illuminated chandelier, you muſt firſt have one made of thin wood. The chandelier being made, bore in the front of the branches, and in the body, and alſo in the crown at top, as many holes for illuminations as they will contain at 3 inches diſtance from each other: in theſe holes put illuminations filled with white, blue, or brilliant charge. Having fixed in the port-fires, clothe them with leaders, ſo that the chandelier and crown may light together. The mouths of the illuminations muſt project ſtraight from the front.

Illuminated Yew Tree.—Firſt have a tree made of wood, as deſcribed above. The middle piece or ſtem, on which the branches are fixed, muſt be 8 feet 6 inches high: at the bottom of this piece draw a line, at right angles, 2 feet 6 inches long at each ſide; then at one foot 6 inches from the bottom, fix the branches. Set on the two top branches parallel to them at bottom: let the length of each of theſe branches be one foot from the ſtem: then fix on 5 more branches between, at an equal diſtance from each other. When the branches are fixed, place illuminating portfires on the top of each, as many as you chooſe: behind the top of the ſtem faſten a gerbe or white fountain, which muſt be fired at the beginning of the illuminations on the tree.

Flaming Stars with brilliant Wheels.—To make a flaming ſtar, you muſt firſt have made a circular piece of ſtrong wood about 1 inch thick and 2 feet diameter: round this block fix 8 points, 2 feet 6 inches long each; 4 of theſe points muſt be ſtraight and 4 flaming: theſe points being joined on very ſtrong, and even with the ſurface of the block, nail tin or paſteboard on their edges, from the block to the end of each, where they muſt be joined: this tin muſt project in front 8 inches, and be joined where they meet at the block; round the front of the block fix 4 pieces of thick iron wire, 8 inches long each, equally diſtant from each other: this being done, cut a piece of paſteboard round, 2 feet diameter, and draw on it a ſtar. Cut out this ſtar, and on the back of it paſte oiled paper; then paint each point half red and half yellow, lengthwiſe; but the body of the ſtar muſt be left open, wherein muſt run a brilliant wheel, made thus: Have a light block turned 9 inches long; at each end of it fix 6 ſpokes; at the end of each ſpoke put a two-ounce caſe of brilliant fire: the length of theſe caſes muſt be in proportion to the wheel, and the diameter of the wheel when the caſes are on muſt be a little leſs than the diameter of the body of the ſmall ſtar: the caſes on the ſpokes in front muſt have their mouths incline outwards, and thoſe on the inſide ſpokes muſt be placed ſo as to form a vertical circle of fire.

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When you place your leaders, carry the firſt pipe from the tail of one of the caſes in front to the mouth of one of the inſide caſes, and from the tail of that to another in front, and ſo on to all the caſes. Your wheel being made, put it on a ſpindle, in the centre of the ſtar; this ſpindle muſt have a ſhoulder at the bottom, to keep the wheel at a little diſtance from the block. This wheel muſt be kept on the ſpindle by a nut at the end; having fixed on the wheel, faſten the tranſparent ſtar to the 4 pieces of wire: when you fire it, you will only ſee a common horizontal wheel; but when the firſt caſe is burnt out, it will fire one of the vertical caſes, which will ſhew the tranſparent ſtar, and fill the large flames and points with fire; then it will again appear like a common wheel, and ſo on for 12 changes.

Projected regulated Piece of nine Mutations.

A regulated piece, if well executed, is as curious as any in fireworks: it conſiſts of fixed and moveable pieces on one ſpindle, repreſenting various figures, which take fire ſucceſſively one from another, without any aſſiſtance after lighting the firſt mutation.

I. Names of the mutations, with the colour of fire and ſize of the caſe belonging to each.

Firſt mutation is a hexagon vertical wheel, illuminated in front with ſmall portfires tied on the ſpokes; this wheel muſt be clothed with 2-ounce caſes, filled with black charge; the length of theſe caſes is determined by the ſize of the wheel, but muſt burn ſingly.

Second mutation is a fixed piece, called a *golden glory*, by reaſon of the caſes being filled with ſpur-fire. The caſes muſt ſtand perpendicular to the block on which they are fixed, ſo that, when burning, they may repreſent a glory of fire. This mutation is generally compoſed of 5 or 7 two-ounce caſes.

Third mutation is moveable; and is only an octagon vertical wheel, clothed with 4-ounce caſes, filled with brilliant charge: 2 of theſe caſes muſt burn at a time. In this wheel you may make changes of fire.

Fourth mutation, is a fixed ſun of brilliant fire, conſiſting of 12 four-ounce caſes: the necks of theſe caſes muſt be a little larger than thoſe of 4-ounce wheel-caſes. In this mutation may be made a change of fire, by filling the caſes half with brilliant charge, and half with grey.

Fifth mutation, is a fixed piece, called the *porcupine's quills*. This piece conſiſts of 12 ſpokes, ſtanding perpendicular to the block in which they are fixed; on each of theſe ſpokes, near the end, muſt be placed a 4-ounce caſe of brilliant fire. All theſe caſes muſt incline either to the right or left, ſo that they may all play one way.

Sixth mutation, is a ſtanding piece, called the *croſs fire*. This mutation conſiſts of 8 ſpokes fixed in a block; near the end of each of thoſe ſpokes muſt be tied two 4-ounce caſes of white charge, one acroſs the other, ſo that the fires from the caſes on one ſpoke may interſect the fire from the caſes on the other.

Seventh mutation, is a fixed wheel, with 2 circular fells, on which are placed 16 eight-ounce caſes of brilliant fire, in the form of a ſtar. This piece is called a *fixed ſtar of wild-fire*.

Eighth mutation. This is a beautiful piece, called a *brilliant ſtar-piece*. It conſiſts of 6 ſpokes, which are ſtrengthened by two fells of

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a hexagon form, at ſome diſtance from each other: at the end of each ſpoke, in the front, is fixed a brilliant ſtar of 5 points; and on each ſide of every ſtar is placed a 4-ounce caſe of black or grey charge; theſe caſes muſt be placed with their mouths ſideways, ſo that their fires may croſs each other.

Ninth mutation, is a wheel-piece. This is compoſed of 6 long ſpokes, with a hexagon vertical wheel at the end of each; theſe wheels run on ſpindles in the front of the ſpokes; all the wheels are lighted together: 2-ounce caſes will do for theſe wheels, and may be filled with any coloured charge.

II. Proportions of the mutations, with the method of conveying the fire from one to the other, and the diſtance they ſtand one from the other on the ſpindle.

Firſt mutation, muſt be a hexagon vertical wheel 14 inches diameter; on one ſide of the block, whoſe diameter is $2\frac{1}{4}$ inches, is fixed a tin barrel. This barrel muſt be a little leſs in diameter than the nave; let the length of the barrel and block be 6 inches. Having fixed the caſes on the wheel, carry a leader from the tail of the laſt caſe into the tin barrel through a hole made on purpoſe, 2 inches from the block; at the end of this leader let there be about 1 inch or 2 of looſe match; but take care to ſecure well the hole wherein the pipe is put, to prevent any ſparks falling in, which would light the ſecond mutation before its time, and confuſe the whole.

Second mutation is thus made. Have a nave turned $2\frac{1}{2}$ inches diameter, and 3 long; then let $\frac{1}{2}$ an inch of that end which faces the firſt wheel be turned ſo as to fit eaſy into the tin barrel of the firſt mutation, which muſt turn round it without touching. On the other end of the block fix a tin barrel. This barrel muſt be 6 inches long, and only half an inch of it to fit on the block. Round the nave fix 5 ſpokes, $1\frac{1}{2}$ inch long each; the diameter of the ſpokes muſt be equal to a 2-oz. former. On theſe ſpokes put five 7-inch 2-oz. caſes of ſpur-fire, and carry leaders from the mouth of one to the other, that they may all light together. Then from the mouth of one of the caſes carry a leader through a hole bored ſlantwiſe in the nave, from between the ſpokes, to the front of the block near the ſpindle hole: the end of this leader muſt project out of the hole into the barrel of the firſt mutation, ſo that when the pipe which comes from the end of the laſt caſe on the firſt wheel flaſhes, it may take fire, and light the 2d mutation. To communicate the fire to the 3d mutation, bore a hole near the bottom of one of the five caſes to the compoſition, and from thence carry a leader into a hole made in the middle of the barrel; this hole muſt be covered with paſted paper.

Third mutation, may be either an octagon or hexagon wheel, 20 inches diameter; let the nave be $3\frac{1}{4}$ inches diameter, and $3\frac{1}{2}$ in length; $1\frac{1}{2}$ inch of the front of the nave muſt be made to fit in the barrel. On the other end of the block fix alſo a tin barrel. This barrel muſt be $6\frac{1}{2}$ inches in length, one inch of which muſt fit over the block, The caſes of this wheel muſt burn 2 at a time; and from the mouths of the 2 firſt caſes carry a leader through holes in the nave, into the barrel of the ſecond mutation, after the uſual manner: but beſides theſe leaders let a pipe go acroſs the wheel from one firſt caſe to the other; then from the tail of one of the laſt caſes carry a pipe into a hole in the middle of the barrel; at the end of this pipe let there be ſome looſe quick-match.

Fourth

Fourth and fifth mutations. These may be described under one head, as their naves are made of one piece, which is 14 inches; first, a block 4 inches diameter, with 10 or 12 short spokes, on which are fixed 11 inch 8-oz. cases: let the front of this block be made to fit easy in the barrel, and clothe the cases so that they may all light together; and let a pipe be carried through a hole in the block into the barrel, in order to receive the fire from the leader brought from the last case on the wheel. The nave of the 5th mutation, must be 4½ inches in diameter; in this nave fix 10 or 12 spokes, 1½ foot in length each; these spokes must stand 7 inches distant from the spokes of the 4th mutation; and at the end of each spoke tie a 4-oz. case. All these cases are to be lighted together, by a leader brought from the end of one of the cases.

Sixth and seventh mutations. The blocks of these 2 mutations are turned out of one piece of wood, whose length is 15 inches. First, a block 5 inches diameter, in which are fixed 8 spokes, each 2 feet 4 inches long; at the end of each spoke tie two 4-oz. cases. All these cases must be fired at the same time, by a pipe brought from the end of one of the cases on the 5th mutation. Let the distance between the spokes, and those in the 5th mutation, be 7 inches. The nave of the 7th mutation must be 5½ inches diameter; in this nave fix 8 spokes, and on the front of them 2 circular fells, one of 4 feet 8 inches diameter, and one of 3 feet 11 diameter; on these fells tie 16 8-oz. or pound cases, and carry leaders from one to the other, so that they may be all fired together. This mutation must be fired by a leader brought from the tail of one of the cases on the 6th mutation.

Eighth and ninth mutations. The blocks of these may be turned out of one piece, whose length must be 12 inches. The block of the 8th mutation, must be 6 inches diameter; and in it must be fixed 6 spokes, each three feet in length, strengthened by an hexagon fell within 3 or 4 inches of the ends of the spokes: close to the end of each spoke, in the front, fix a five-pointed brilliant star; then 7 inches below each star tie two 10-inch 8-oz. cases, so that the upper ends of the cases may rest on the fells, and their ends on the spokes. Each of these cases must be placed parallel to the opposite fell.

The 9th mutation must have a block 7 inches diameter. In this block must be screwed 6 spokes, 6 feet long each, with holes and grooves for leaders, as those in the dodecaedron; at the end of each spoke, in the front, fix a spindle for a hexagon vertical wheel, 10 inches diameter. When these wheels are on, carry a leader from each into the block, so that they may all meet; then lead a pipe from the end of one of the cases of the 8th mutation, through a hole bored in the block, to meet the leaders from the vertical wheels, so that they may all be fired together.

The spindles for larger pieces are required to be made very strong, and as exact as possible: for a piece of 9 mutations, let the spindle be at the large end 1 inch diameter, and continue that thickness as far as the 7th mutation; and thence to the 5th, let its diameter be ¾ of an inch; from 5th to the 4th, 5-8ths of an inch; from the 4th to the 2d, ½ inch; and from the 2d to the end, 3-8ths of an inch. At the small end must be a nut to keep on the first wheel, and at the thick end must be a large nut; so that the screw part of the spindle being put through a post, and a nut screwed on tight, the spindle

will be held faſt and ſteady: but you are to obſerve, that that part of the ſpindle on which the moveable pieces are to run, be made long enough for the wheels to run eaſy without ſticking; the fixed pieces being made on different blocks, the leaders muſt be joined, after they are fixed on the ſpindle. The beſt method of preventing the fixed mutations from moving on the ſpindle, is to make that part of the ſpindle which goes through them ſquare; but, as it would be difficult to make ſquare holes through ſuch long blocks as are ſometimes required, it will be beſt to make them thus: Bore a hole little larger than the diameter of the ſpindle, and at each end of the block, over the hole, faſten a piece of braſs with a ſquare hole in it to fit the ſpindle.

To make an Horizontal Wheel change to a Vertical Wheel with a Sun in front.

The ſudden change of this piece is very pleaſing; and gives great ſurpriſe to thoſe who are not acquainted with the contrivance. A wheel for this purpoſe ſhould be about three feet diameter, and its fell circular; on which tie 16 half-pound caſes filled with brilliant charge: two of theſe caſes muſt burn at a time; and, on each end of the nave muſt be a tin barrel of the ſame conſtruction as thoſe on the regulated piece. The wheel being completed, prepare the poſt or ſtand thus:—Firſt have a ſtand made of any height, about three or four inches ſquare; then ſaw off from the top a piece two feet long; this piece join again at the place where it was cut, with a hinge on one ſide, ſo that it may lift up and down in the front of the ſtand; then fix on the top of the bottom-part of the ſtand, on each ſide, a bracket; which brackets muſt project at right angles with the ſtand, one foot from the front, for the ſhort piece to reſt on. Theſe brackets muſt be placed a little above the joint of the poſt, ſo that when the upper ſtand falls, it may lie between them at right angles with the bottom ſtand; which may be done by fixing a piece of wood, one foot long, between the brackets, and even with the top of the bottom ſtand; then, as the brackets riſe above the bottom ſtand, they will form a channel for the ſhort poſt to lie in, and keep it ſteady without ſtraining the hinge. On the ſide of the ſhort poſt, oppoſite the hinge, nail a piece of wood, of ſuch a length, that, when the poſt is perpendicular, it may reach about 1½ foot down the long poſt; to which being tied, it will hold the ſhort ſtand upright. The ſtand being thus prepared, in the top of it fix a ſpindle ten inches long: on this ſpindle put the wheel: then fix on a brilliant ſun with a ſingle glory; the diameter of this ſun muſt be ſix inches leſs than that of the wheel. When you fire this piece, light the wheel firſt, and let it run horizontally till four caſes are conſumed: then from the end of the fourth caſe carry a leader into the tin barrel that turns over the end of the ſtand: this leader muſt be met by another brought through the top of the poſt, from a caſe filled with a ſtrong port-fire charge, and tied to the bottom poſt, with its mouth facing the packthread which holds up the ſtand; ſo that, when this caſe is lighted, it will burn the packthread, and let the wheel fall forward, by which means it will become vertical: then from the laſt caſe of the wheel, carry a leader into the barrel next the ſun, which will begin as ſoon as the wheel is burnt out.

Grand Volute illuminated with a projected Wheel in front.—Firſt have two hoops made of ſtrong iron wire, one of 6 feet diameter, and one

one of 4 feet 2 inches; these hoops muſt be joined to ſcrolls. Theſe ſcrolls muſt be made of the ſame ſort of wire as the hoops; on theſe ſcrolls tie, with iron-binding wire, as many illuminating port-fires as they will hold, at two inches diſtance; clothe theſe port-fires with leaders, ſo that they may all take fire together.—Then add a circular wheel of four ſpokes, 3 feet 6 inches diameter; and on its fell tie as many 4-oz. caſes, head to tail, as will complete the circle, only allowing a ſufficient diſtance between the caſes, that the fire may paſs free; which may be done by cutting the upper part of the end of each caſe a little ſhelving: on each ſpoke fix a 4-oz. caſe, about three inches from the fell of the wheel: theſe caſes are to burn one at a time, and the firſt of them to begin with thoſe on the fell, of which four are to burn at a time; ſo that the wheel will laſt no longer than ¼ of the caſes on the fell, which in number ſhould be 16 or 20. On the front of the wheel form a ſpiral line with ſtrong wire, on which tie port-fires, placing them on a ſlant, with their mouths to face the ſame way as the caſes on the wheel: all theſe port-fires muſt be fired with the ſecond caſes of wheel. Let the ſpokes of wood be all made to ſcrew into a block in the centre; each of theſe ſpokes may be in length about 4 feet 6 inches; in the top of each fix a ſpindle, and on each ſpindle put a ſpiral wheel of eight ſpokes. The blocks of theſe wheels muſt have a hole at top for the centre caſes, and the ſpindle muſt have nuts ſcrewed on their ends; which nuts ſhould fit in the holes at top of the blocks, ſo that all the wheels muſt be put on before you fix in the centre caſes: as ſome of theſe wheels, by reaſon of their ſituation, will not bear on the nut, it will be neceſſary to have ſmooth ſhoulders made on the ſpindles for the blocks to run on. The caſes of theſe wheels are to burn double; and the method of firing them, is by carrying a leader from each down the ſpokes into the block in the centre, as in the dodecaedron, but the centre caſe of each wheel muſt begin with the two laſt caſes as uſual. It is to be obſerved, that the large circular wheel in front muſt have a tin barrel on its block, into which a pipe muſt be carried from one of the ſecond caſes on the wheel; this pipe being met by another from the large block, in which the eight ſpokes are ſcrewed, will fire all the ſpiral wheels and the illuminating port fires at the ſame time. The caſes of the projected wheel may be filled with a white charge, and thoſe of the ſpiral wheels with a grey.

Moon and Seven Stars.—Procure a ſmooth circular board 6 feet diameter: out of the middle of it cut a circular piece 12 or 14 inches diameter; and over the vacancy put white Perſian ſilk, on which paint a moon's face: alſo ſundry ſtars, each 4 or 5 inches diameter, cut out with five points, and covered with oiled ſilk: on the front of the large circular board draw a 7-pointed ſtar, as large as the circle will allow; then on the lines which form this ſtar, bore holes, wherein fix pointed ſtars. When this caſe is to be fired, it muſt be fixed upon the front of a poſt, on a ſpindle, with a wheel of brilliant fire behind the face of the moon: ſo that, while the wheel burns, the moon and ſtars will appear tranſparent: and when the wheel has burnt out, they will diſappear, and the large ſtar in front, which is formed of pointed ſtars, will begin, being lighted by a pipe of communication from the laſt caſe of the vertical wheel, behind the moon; this pipe muſt be managed in the ſame manner as thoſe in regulated pieces.

Double

Double Cone-Wheel illuminated.—Make a ſtrong decagon wheel, 2 feet 6 inches diameter; then on each ſide of it fix a cone; theſe cones are to conſiſt of a number of hoops, ſupported by 3 or 4 pieces of wood, in the manner of the ſpiral wheels. Let the height of each cone be 3 feet 6 inches; and on all the hoops tie port-fires horizontally, with their mouths outwards, and clothe the wheel with 8-oz. caſes, all to play horizontally, two at a time: the cones may be fired with the firſt or ſecond caſes. The ſpindle for this piece muſt go through both the cones, and riſe three feet above the point of the cone at top; ſo that its length will be 10 feet 4 inches from the top of the poſt, in which it is fixed, allowing four inches for the thickneſs of the block of the wheel. The whole weight of the wheel and cones muſt bear on a ſhoulder in the ſpindle, on which the block of the wheel muſt turn.—Near the top of the ſpindle muſt be a hole in the front, into which ſcrew a ſmall ſpindle, after the cones are on: then on this ſmall ſpindle fix a ſun, compoſed of ſixteen 9-inch 4-oz. caſes of brilliant fire; which caſes muſt not be placed on a fell, but only ſtuck into a block of ſix inches diameter: then in the front of this ſun muſt be a circular vertical wheel, ſixteen inches diameter; on the front of this wheel form with iron wire a ſpiral line, and clothe it with illuminations after the uſual method. As this wheel is not to be fired till the cones are burnt out, the method of firing it is thus:—Let the hole in the block, at the top of the uppermoſt cone, be a little larger than the ſpindle which paſſes through it. Then, from the firſt caſe of the vertical wheel before the ſun, carry a leader down the ſide of the ſpindle to the top of the block of the horizontal wheel, on which muſt be a tin barrel: then this leader being met by another brought from the end of the laſt caſe of the horizontal wheel, will give fire to the vertical wheel ſo ſoon as the cones are extinguiſhed: but the ſun muſt not be fired till the vertical wheel is quite burnt out.

[*To be continued.*]

PRESENT STATE OF SCIENCE IN PIEDMONT.

MATHEMATICS.

THE Piedmonteſe cheriſh with exultation the remembrance that La Grange is their countryman. His father had deſtined him for the profeſſion of the law, but the irreſiſtible force of true genius impelled him to thoſe ſtudies which he has cultivated with ſo much ſucceſs, and which render him ſo bright an ornament to the polytechnical ſchool at Paris. The celebrated Counts de Saluces, and Michelotti, with the Abbé de Caluzo, are ſtill living, and there is no room to doubt that their lucubrations will in ſome meaſure indemnify the republic of letters for the loſs it has ſuſtained by their retirement.

EXPERIMENTAL PHYSICS.—The high reputation which Beccaria acquired in this branch of ſcience, is ſufficiently known. His ſucceſſors, Landi and Vaſſali, have rendered themſelves illuſtrious by a number of learned works in this department, particularly by a Treatiſe on Electricity. The cabinet of natural philoſophy ſcarcely admits of improvement, and Turin may juſtly claim a ſuperiority in experimental phyſics.

CHEMISTRY.—Giobert has long combated the new principles of chemiſtry. His works, which are numerous, bear inconteſtable evidence to his conſummate knowledge of the ſcience, which ſtands indebted to him for a much approved acidiometer. Doctor Buonvicini is indefatigable in his reſearches for the promotion of chemical knowledge. His laboratory is on a very extenſive ſcale, and he gives private lectures in this ſcience, as the univerſity of Turin cannot, as yet, boaſt the advantage of a public profeſſorſhip for chemiſtry.

NATURAL HISTORY and BOTANY.—If Switzerland is proud of its Bauhins, France of its Tournefort, and Sweden of the great Linnæus, Turin is not leſs vain of Charles Allioni. This veteran of ſcience, who is turned of ſeventy, retains the unimpaired uſe of his excellent faculties. Like Bonnet, whom he ſtrongly reſembles, he has nearly loſt his eye-ſight by intenſe ſtudy. This defect obliges him to employ an amanuenſis. His Piedmonteſe Flora is deſervedly celebrated; and the Tranſactions of the Academy at Turin have been enriched by a number of intereſting memoirs from his pen, on almoſt every ſubject of natural hiſtory.

Dana, profeſſor of botany, and Doctor Belardi, the worthy pupil of Allioni, are entitled to conſiderable praiſe. The latter, who has acquired no ſmall reputation by his Appendix to the Piedmonteſe Flora, is at preſent occupied upon a work on the *cryptogamia*. The botanical garden, though ſmall, contains four thouſand different ſpecies of plants. Allioni, whoſe indefatigable zeal in the cauſe of ſcience out-ſtrips all panegyric, has lately obtained from government the grant of a neighbouring piece of ground, which will be chiefly devoted to the plantation of thoſe trees, the actual number of which, at preſent, is but ſmall.

MINERALOGY.—Although this ſcience has not attained to an equal degree of improvement with botany, it is nevertheleſs very generally cultivated. Among the moſt celebrated characters in this department, is the Chevalier Napioni, who has lately publiſhed the firſt volume of a work on this ſcience, in Italian. This firſt volume treats of lithology; and the maſterly manner in which the author has handled his ſubject, cauſes the reader to wiſh, that the publication of the two remaining volumes may be accelerated as much as poſſible. He founds his ſyſtem upon the phyſiognomy and analyſis of minerals. The mineral collection belonging to the academy is far from being conſiderable; it poſſeſſes, however, ſome varieties. The cabinet of Allioni, in particular, is uncommonly rich in petrifactions.

MEDICINE.—This ſcience has lately ſuſtained a very ſevere loſs in the deaths of Cigna and Somis. The former of theſe gentlemen was one of the founders of the academy, and has obliged the world with ſome learned diſquiſitions on phyſiology. A number of memoirs inſerted in the tranſactions of the academy at Turin, ſufficiently atteſt the profound medicinal erudition of the ſecond.

Allioni, whoſe name is an ornament to the whole range of ſcience, is the author of ſeveral works on medicine in general, on the military fever, the pellagra, &c. &c. He propoſes ſhortly to publiſh a new confirmation of the doctrine of Bordeu and Fouquet, relative to the pulſe. Among the profeſſors of the univerſity, the names of Dana and Juli, profeſſors of anatomy, are in high eſtimation.

LITERATURE

LITERATURE and FINE ARTS.—The juſtly celebrated hiſtorian Charles Denina, publiſhed, in 1792, a new augmented edition of his Revoluzioni d'Italia, and his Delle Vicende della Literatura.

The fine arts, being the offspring of luxury and peace, have, of courſe, felt the effects of war, and will, no doubt, require a conſiderable length of time to recover their original luſtre; as the government is not in the capacity of giving them ſufficient encouragement.

Vincenzio-Antonio Revelli has recently publiſhed the *proſpectus* of an Italian work, entitled, Opere Filoſofiſche Pittoriche. The importance and grandeur of the plan, entitle it to particular notice. After a pompous eulogium on the art of painting, conſidered in its relations to politics and morals, the author communicates the different proceſſes he obſerved in painting, by natural and artificial lights, with his motives for engaging in the preſent work. The learned diſſertations of Winckelman, Mengs, Sultzer, &c. on the ſubject of Ideal Beauty, appear to him, he obſerves, by no means to have exhauſted the ſubject, which he treats in a point of view altogether novel and original. He examines upon what baſis the ideal beautiful is founded, and on what laws it depends; and concludes, that the Beautiful, or Bellezza, conſiſts in the particular form and organization beſt adapted to the animal functions. This aſſertion he corroborates by an exact analyſis of twelve maſter-pieces of ſculpture, which have been preſerved from the works of antiquity. He next enters upon an examination of the works of Camper, explores his ideas of different temperaments, original tactics, characters, &c. &c. and, by a natural tranſition, treats of the paſſions, which he divides into ſimple and compound; of their general and particular effects; of all accidental impreſſions, &c. He points out the method of rendering them according to their true expreſſion, in conformity to the leſſons furniſhed by the twelve models which he has ſelected. Nothing eſcapes his diſcernment, and it is to be hoped, that the work will fully anſwer the expectation univerſally excited by the *proſpectus*, which there is every reaſon to look for.

The academy, which owes its foundation to the zeal of La Grange, Cigna, and Saluces, conſiſts of nearly all the literary characters in Piedmont. Its memoirs occupy an honourable ſtation in academical collections.

Excluſive of five volumes of Miſcellanea, there have appeared five additional volumes of Memoirs, in the French language. The Count de Morozzo continues to merit the honourable rank of preſident by his zeal and knowledge. His colleagues aſſiſt him with ardour; and, with the ſupport of ſuch brilliant talents, there is every reaſon to hope that this ſociety will maintain the high reputation it ſo juſtly poſſeſſed before the revolution.

The Public Library contains about 24,000 volumes. It abounds eminently in works upon the ſubject of Natural Hiſtory. The botaniſts contemplate, with pleaſure, twenty-eight volumes of plants, coloured after nature, by a Piedmonteſe artiſt. Each volume contains one hundred and fifty plants, and it is ſuppoſed that the number of volumes, when complete, will amount to forty five. A new volume appears every year.

SIGNS OF DANGER IN A THUNDER STORM, AND BEST METHOD OF SHELTER AND PROTECTION.

THE ſigns of approaching danger which may be ſelected as the moſt unequivocal and deciſive are the following: 1ſt, *A rapid approach of the charged clouds.*—The longer any given portion of charged air is over the earth, the more is it affected by points and prominences; but, when a cloud ſeems to be no ſooner formed than it is over our heads, we are then expoſed to its undiminiſhed fury. The ſame may be ſaid of a cloud, which, while it is near us, grows darker and darker; for, in this caſe, we may be certain that the collection is not materially leſſened by any exhauſtion, and that the charge muſt ſoon accumulate to its ſtriking height.

2dly, *The perpendicular direction of the flaſhes.*—This is a certain evidence that the charged clouds are at that height from which they can ſtrike into the ground. Some electricians have conſidered the appearances of two flaſhes at the ſame moment as an evidence that the earth is acting as a diſcharging-rod. But though this may often happen, as often the two extremities of the flaſh, when paſſing behind a cloud which partly hides it, will ſhew the ſame appearance. The ſign therefore is not ſufficiently appropriate, and conſequently cannot be conſidered as expreſſing more than a certain degree of probability.

3dly, An inſulated conductor, whoſe language, to thoſe who are acquainted with it, is ſeldom equivocal; a torrent of ſparks flows through its interruption when danger is near. If that torrent, after continuing for ſome time, ſhould ſuddenly ſtop, and again, after an entire abſence of all ſigns, ſhould rapidly return with an electricity oppoſite to what it ſhewed at firſt, it is certain, that during the ceſſation of ſparks, the conductor paſſed the limits of the greateſt danger. The torrent of fluid, whoſe ſtrength and rapidity are peculiar to this caſe, is attended with a loud and ſingular ſucceſſion of ſounds. Mr. Brook very accurately compares it to the noiſe made by a church or turret clock immediately after it has ceaſed ſtriking.

Let us next ſuppoſe that we are juſtified, by the preceding ſigns, in apprehending that our ſituation is within the ſtriking diſtance, it is an object of importance, in ſuch circumſtances, to know how the threatened injury may be avoided.

If the lightning ſhould enter your dwelling, you are certain it will paſs from one partial conductor to another, and that this ſeries of partial conductors is always the appendage of walls and partitions: you will therefore place yourſelves in the middle of a room, becauſe the air will then ſeparate you from the ceiling and the ſides of the room, and will form ſuch an interruption in the circuit as muſt neceſſarily determine the preference of the ſtroke through the connected parts of the building.

In the open air, it is the ſafeſt method to keep at a diſtance from all high and pointed objects; for, if you ſtand near them during the ſtorm, you may become part of their circuit, ſimilarly to what happens when you are near a wall or a partition. Beſides, if the object be ſtricken, you may be deſtroyed by the circumſtances of its deſtruction. Many are the inſtances in which travellers, who have fled

fled under high trees for ſhelter, have been either killed by the lightning, or daſhed to pieces by ſplinters of wood.

In the open air, you ſhould avoid every approach to rivers and brooks, and more eſpecially to thoſe freſh ſtreams of water which have been formed by the thunder-ſhowers; for they are all excellent diſcharging-rods; and, when it is joined to them, the height of a human being furniſhes a prominence very likely to determine the courſe and to lengthen the ſtriking diſtance of the lightning.

In the open air, any covered carriage is a protection, provided you can ſit in it at the diſtance of ſome inches from the ſides. Indeed, vehicles of this kind might be made the ſafeſt of all poſſible ſituations, by ſurrounding them at the top and the bottom with thin metallic fillets, connected with each other by a ſtrip of the ſame ſubſtance.

It is admitted by all electricians, that buildings and ſhips may, by certain means, be completely protected from the violence of lightning; but the reputation of every method, hitherto preſcribed, has been ſhaken by accidents of injury within the ſuppoſed ſphere of their activity. Many are the inſtances in which houſes have been damaged when armed with a ſingle pointed conductor; and we have ſeen much labour beſtowed on the inveſtigation of one frightful caſe, in which a building, ſecured by a ſix pointed conductors, was ſet on fire by a ſingle flaſh.

It appears to us, that the beſt means of protection can be known only in conſequence of a thorough ſearch into the various combinations of perilous circumſtances which can occur. When theſe are clearly underſtood, we have every neceſſary direction for the ſituation of our rods; in other words, our conductors may be ſo placed, that the lightning cannot poſſibly enter into any circuit of which they are not a part.

MISCELLANEOUS COMMUNICATIONS.

Water Works.

THE Ruſſian government has, by a canal in its late Poliſh acquiſitions, opened a navigation between the Black Sea and the Baltic. A veſſel laden with ſalt, of 100 tons burden, has already paſſed by this canal from Cherſon, in the Crimea, to Konigſberg, in Pruſſia. The rivers which flow into theſe diſtant ſeas are ſo near, that the canal itſelf is only eight miles; yet there are few inland navigations in the world which unite more remote countries with each other by the band of commercial intercourſe.

The following is a deſcription of a communication between the counties of Kent and Eſſex, projected by Mr. R. Dodd, engineer, to be effected by a tunnel under the River Thames from Graveſend to Tilbury.

The communication is propoſed by the projector, to be by a cylindrical tunnel, to be conſtructed wholly with key-ſtones; therefore, the greater the preſſure, the ſtronger will be the work.—The diameter to be 16 feet in the clear, which Mr. Dodd imagines will be ſufficient for foot, horſe, and carriage, paſſengers—the paſſage to be illuminated with lamps, and a ſteam engine to be erected in a proper ſituation to draw off the drainage water, if any ſhould accumulate.

The

The expence of this ſtupendous undertaking is eſtimated at ſo low a ſum as 15,955l. for 900 yards of tunnelling, relaying the bottom, lamps, lamp irons, ſteam engines, pipes, and other neceſſary machinery.

This projected meaſure will ſave a circuitous route of 50 miles by land; (the diſtance from Graveſend to Tilbury, along London bridge.) Independent of the advantage it would afford to commercial eſtabliſhments and agricultural improvements, the general benefit to the counties of Kent and Eſſex muſt be immenſe.

Mr. Dodd is of opinion, that whether the meaſure is conſidered as a great national improvement, or a local one to the two counties, of forming a military poſt of the firſt conſequence in that part of the kingdom, for enabling troops, &c. to paſs through, its importance claims the greateſt attention. Another queſtion he ſuggeſts, is, what may be the moſt proper method of raiſing the ſupplies to defray the expence of the undertaking.—Whether by the joint expence of both counties, or by a ſubſcription of private individuals, incorporated by parliament, with authority to levy toſls? The latter mode, he is convinced, would be beneficial to the individuals, and amply repay the ſhare-holders.

The following are the eſtimates of the expence, as ſuggeſted by Mr. Dodd, in the firſt inſtance:

To 900 yards (running meaſure) of tunnelling, including excavations, vaulting with key ſtones, &c. at 12l. per yard,	£10,800
Relaying the bottom with new-made ground, 900 yards, at 1l. each, - - - - - -	900
Placing lamps and lamp-irons through the tunnel, collectors rooms, and gates at each end, - - -	400
Making good the entrance roads at each end of the tunnel,	160
To a ſteam engine to draw off drainage water, -	1,780
Neceſſary machinery during the execution, -	500
Ten per cent. upon the whole for contingencies, -	1,400
Total,	£15,955

An engineer, of the name of Detrouville, has communicated to the council of five hundred, at Paris, an hydraulic diſcovery, by which he could raiſe, without mechanics, water in a large body to the greateſt diſtance and height. He had laid his plan before the conſtituent aſſembly, who, upon the report of their committees of agriculture and commerce, placed the diſcovery under the national protection, as likely to have the greateſt influence upon trade, agriculture, and the arts. As the decree of that aſſembly had not been executed, he requeſted that it might be carried into execution, and that a committee might be named to examine the different applications of the art of raiſing water without mechanics, for the Luxembourg, the Thuilleries, and the fountains of Paris, and particularly for the completing of the canal from Havre to Paris, by the Park of Verſailles. This canal, 16 feet deep, would bring ſhips of 4 or 500 tons to anchor in the Elyſian Fields, by a ſhortening of the diſtance of more than 30 leagues. The expence would be 50 millions, which he propoſed ſhould be raiſed by public ſubſcription. The plan was referred to a ſpecial commiſſion.

HEALTH.

HEALTH.—It is obfervable, that, notwithftanding the total difregard to cleanlinefs on-board the Ruffian fhips of war, the feamen are feldom infected with that marine peftilence the fcurvy, and never in that inveterate degree which is common in the Englifh navy after long voyages. The exemption of the Ruffian feamen from the fcurvy is attributed to the quality of their ordinary beverage, an account of the method of preparing which here follows.

The Ruffians prepare at fea, as well as land, a liquor of a middle quality, between wort and fmall beer, in the following manner: They take ground malt and rye-meal in a certain proportion, which they knead into fmall loaves, and bake in the oven. Thefe they occafionally infufe in a proper quantity of water, which begins fo foon to ferment, that in the fpace of 24 hours, their beverage is completed, in the production of a fmall, brifk, acidulous, liquor, which they call quas, palatable to themfelves, and not difagreeable to the tafte of ftrangers.

The late Dr. Mounfey, member of the royal fociety, who had lived long in Ruffia, and had been archiater under two fucceffive fovereigns, informs us that quas was the common and wholefome drink both of the fleets and armies of that empire, and that it is particularly good againft the fcurvy. He adds, that happening to be at Mofcow when he perufed "Obfervations on the Gaol-fever," publifhed in London, he was induced to compare what he read in that treatife with what he fhould fee in the feveral prifons of that large city; but to his furprize, after vifiting them all, and finding them full of malefactors, he could difcover no fever among them, nor learn that any acute diftemper peculiar to gaols had ever been known there. He obferves that fome of thofe places of confinement had a yard, into which the prifoners were allowed to come for air; but there were others without this advantage, yet not fickly; fo that he could affign no other reafon for the healthful condition of thofe men than the kind of diet they ufed; which was the fame with that of the common people of the country, who, not being able to purchafe flefh-meat, live moftly on rye-bread (the moft acefcent of any bread) and drink quas. He concludes with faying, that upon his return to Peterfburgh he made the fame enquiries there, and with the fame refult.

NATURAL HISTORY.—A correfpondent informs us, that a horfe mackarel was lately caught at Province-Town, Cape Cod, North America, which weighed from eight to nine cwt. he got entangled in the eel-grafs, where the tide left him, and was drawn out with a boat-hook. The perfon who caught this large fifh refides in Butler's-row, in Bofton, and was then at Province-Town on bufinefs. A large number of the inhabitants were fed from it for feveral days, fending their children to cut off pieces as it lay on the beech. From the cawl and the remnant of the carcafe twenty-eight gallons of oil were obtained.

Some fifhermen at the Black Rock, near the Troon, brought on fhore a fhark of confiderable magnitude, and pretty lively, but unable to make any refiftance, on the fandy beach. About two hours after, a gentleman (who had feen it when taken) went again to view the animal, when obferving its belly to be of an uncommon bignefs, and in a ftate of agitation, he took a knife and ripped it open,

open, and, to his aſtoniſhment, found therein nineteen young ſharks, about a foot in length, and all alive.

The following ſingular circumſtance happened lately at Eaſt Bourne:—As Serjeant Richards, of the Monmouth and Brecon militia, was buſily employed in drilling a number of men, a very large ſwarm of bees alighted upon his head and ſhoulders, from whence they were hived, without any other hurt to the ſerjeant than a ſingle ſting, which he received from the firſt bee that ſettled on his arm, and which with his other hand he attempted to kill or drive away.

There is now in the poſſeſſion of Mr. Mundy, of Wick Farm, near Abingdon, a cock turkey, which being tired of his life, during the confinement of the hens while ſitting, ſeemed deſirous to ſit himſelf, which he did very cloſely for a week upon a rotten gooſe egg: Mr. Mundy, thinking it a pity that ſo good a nurſe ſhould not be rewarded for his attention, put 13 hens eggs in a neſt, on which he ſat three weeks longer, and hatched 12 fine chickens, which enjoy, if poſſible, more attention than uſual.

SALTEE ISLAND, the retreat of the late Mr. Bagenal Harvey, who ſuffered death for the part he took in the preſent Iriſh rebellion, lies at about three miles diſtance off Waterford, and was the property of Mr. Grogan, who with his wife and child had accompanied Mr Harvey in his flight.

The iſland which is only inhabited by an old man and his wife, who were dependent on Mr. Grogan, is an extremely romantic ſpot, abounding with rocks and caves, but produces nothing of conſequence, and is ſeldom viſited except in the fiſhing and ſhooting ſeaſons; ſometimes indeed ſmugglers put in there to conceal their run goods, for which no ſituation can be better calculated, as without ſome information to lead to the depot, all ſearch would be in vain, which indeed proved to be the fact in reſpect to Mr. Harvey and his companions; for though they were ſuſpected of having ſecreted themſelves there, notwithſtanding the ſtory of the boatman, who pretended he had landed them at St. David's, in Wales, yet a party of the Iriſh yeomanry, who went in purſuit of them, returned without being able to diſcover their retreat, after exploring various caverns and holes, where perhaps the human form had never entered before.

Satisfied, however, that he muſt be there, they went a ſecond time, taking with them ſome of the regular troops; and, finding the old man perſiſt in denying any knowledge of Mr. Harvey's being there, they proceeded to coercive means, and, after giving him about 100 laſhes, he confeſſed the truth, and conducted them to the ſpot, a cavern in the moſt remote part of the iſland, the mouth of which was ſtopped up with ſtones, which, on being removed, preſented a dark ſubterraneous paſſage, on penetrating which they were led to a large ſpace or room, formed by nature in a rock, where they found Mr. Harvey, Mr. Grogan, and his wife and child, ſitting by a lighted lamp, and who had taken with them ſufficient proviſion for a month, and every neceſſary that could afford comfort in ſo ſecluded a retreat.

They ſubmitted without the leaſt oppoſition; but the ſcene that took place between Mr. Grogan and his wife was truly affecting. Among their baggage was found 2000 guineas, the property of Mr. Harvey. They were marched to a ſmall boat, which waited for the officers, and

and landed in Wexford On landing at the Quay, Mr. Harvey appeared quite dejected and extremely pale, but Mr. Colclough's fortitude did not apparently forsake him, until he approached the jail, where he beheld his friend Keogh's head on a spike: on enquiring whose that head was, and hearing it was Keogh's, he seemed like a man electrified, and sunk into all the anguish of despair and guilt. He never recovered any show of spirits. They were both tried the next morning, and convicted. On the ensuing day they were hanged, pursuant to their sentence.—Mr. Harvey possessed an unincumbered estate of near 2000l. a year, besides personal property to the amount of 20,000l. He married, about a year since, a young woman of considerable personal merit, but no fortune, the daughter of an honest industrious tradesman, of Clonegall. She was lately delivered of a son, and remains in a situation of mind bordering on distraction.

The unfortunate younger brother of Mr. Grogan, who was executed, went from Arklow, under an escort of yeomanry to Wexford, to take possession of his brother's property, on hearing of his death. The second brother was killed fighting for the king the day the other was executed. The eldest was worth 7 or 8000l. per annum. Grogan and Harvey were executed together. Before Grogan was turned off, he turned round to Harvey, and said, "Harvey, speak the truth in your last moments. Was I not forced?" Harvey answered, "You were." Grogan was an avaricious man, and his avarice led to his death. Before the rebels entered Wexford, he quitted it; but recollecting that there were bonds and notes to the amount of 6000l. he returned for them, and was detained by the rebels. He then made a virtue of necessity—acted as commissiary to the rebel army—and appeared in those situations from whence his guilt was clearly inferred.

Messrs. SHEARES. These two young men, whose dreadful fate was contrary to the expectations with which they were ushered into life, were the sons of an eminent banker of Cork, who left Henry, the elder, about 400l. per annum, which, by the addition of his mother's jointure, was soon encreased to 800l. a-year or upwards. At an early age he married a Miss Sweet, of Cork, who was reputed an immense fortune, not less than 40,000l. but, instead of this golden expectation being in any degree answered, it is said that his endeavours to relieve the affairs of this lady's deceased father from the embarrassments in which they were involved had so materially injured his own, as to oblige him to go to the South of France for purposes of œconomy, where he resided for more than three years; part of this period being previous, and part during, the early struggles of the French revolution. His brother John was his companion in this œconomical emigration, and they both entered into the spirit of the times with emulous ardour; and it is said were in Paris during the most convulsive efforts which ushered the republic into existence. When they returned to this country, they did not leave behind them the spirit they had imbibed, and its manifestation caused Henry a short period of arrest (if we mistake not) in the year 1792. In the formation and early growth of the original Society of United Irishmen, H. Sheares assumed a conspicuous part, and his name appears annexed to the chair, when some of their strongest resolutions were passed, and their most spirited sentiments were expressed. The two brothers were also distinguished equally for their zeal and imprudence at the

time when the meaſures of J. N. Tandy and A. H. Rowan ſubjected the one to flight, and the other to impriſonment: the Meſſrs Sheares having travelled about the country in an open chaiſe, circulating a printed paper of a moſt dangerous and inflammatory nature. Indeed the complexion of their politics was ſo well and ſo generally known, that it is matter of public aſtoniſhment they were able to act with ſuch caution as to enſure their exemption from arreſt at the time when Meſſ. Bond, Jackſon, and ſo many others, were taken up. H. Sheares had been a lieutenant in the 11th foot previous to his taking to the bar. John poſſeſſed by much the greater portion of talent; and even his enemies pay conſiderable deference to his literary abilities: his original fortune was 2000l. the profeſſional practice of either was not very conſiderable. It was a ſingular, and to one of the parties muſt have been a diſtreſſing, fact, that Lord Carleton, who preſided during the trial, and pronounced judgment on theſe unfortunate gentlemen, was one of the executors to their father's will, and had been his old and intimate friend.

About eleven o'clock on the morning of the day on which thoſe unhappy gentlemen were to have been executed, they intimated to government that they would make a full and ample diſcovery of all that they knew reſpecting the preſent conſpiracy and rebellion in this kingdom: not for the purpoſe of ſaving their lives altogether, but merely on the condition of being allowed ſome time for neceſſary recollection, and for the adjuſtment of Henry Sheares's affairs. This was communicated to Lord Caſtlereagh by the Rev. Mr. Gamble, ordinary of Newgate, who, from the moment of their being ſentenced to that of their death, paid them every attention which humanity and the duties of his office required. Their propoſal was, however, rejected by government, and they were told that it was thought expedient, for the welfare of the country and the ſuppreſſion of rebellion, to accelerate, with all poſſible ſpeed, the awful example of their deaths. From the moment this determination was announced to them, they made immediate and manly efforts to arouſe themſelves from that ſtate of grief and dejection into which they had been immerſed, and to meet their fate with fortitude and reſignation— thoſe who ſaw them executed can witneſs they ſucceeded. On the ſcaffold, Mr. J. Sheares, who was throughout the whole buſineſs by much the firmer of the two, ſaid, that he earneſtly hoped their deaths would be followed by the deſired effect, and contribute to the reſtoration of the public tranquillity; but much he feared that the expectation would be fruitleſs, and that their deaths would be found an unpropitious and a barren ſacrifice. Mr. Gamble obſerved, that ſuch ſentiments ſeemed to intimate, that the forms of juſtice were ſtrained to the purpoſes of a local policy, adding, that the law was above being vindictive, and, if it puniſhed ſome to deter others, the guilt of the party formed the ground of its judgments; that they could not be ignorant what a deluge of blood had been ſhed in this afflicted country, through the example which a few men of birth and talents had held forth to a flexile and deluded multitude; and he hoped and believed, ſince ſuch was the aſſurance which they gave him, that this terrible waſte of blood and national calamity formed no part of their intentions, but certainly theſe ſad effects were the conſequences. Their intentions were between God and their conſciences, and he hoped the latter were clear on that point. Mr. J. Sheares

Sheares ſaid, that the government acted with a blind and erring impetus, and little knew whom they ought to execute. Mr. G. cenſured this obſervation ,and the manner of its being expreſſed, as favouring of vindictiveneſs; but he hoped that, as Mr. S. had in the morning communicated with his God, and availed himſelf of the religious advantages which the death of Chriſt held forth to penitent humanity, he was about to die in perfect charity with all mankind. Mr. John Sheares then replied, and they were the laſt words he ſpoke, "As I expect forgiveneſs, I forgive the world." Henry Sheares reſigned himſelf ſilently, but in a manly manner, to his fate.

ACCURATE DESCRIPTION OF SICILY.

THIS iſland, which is the moſt conſiderable in the Mediterrenean, was anciently known by ſeveral names; as thoſe of Trinacria, and Triquetra, from its triangular form; and Sicania and Sicilia from its ancient inhabitants the Sicanii. It terminates in three points or capes; that neareſt Italy is called Capo di Faro; that which regards the Morea is called Capo Paſſaro; and the third, which points to Africa, is named Capo di Bono. Its greateſt length is two hundred and ten miles, and its greateſt breadth one hundred and thirty-three. Sicily is ſeparated from the kingdom of Naples by the ſtraight of Meſſina, which, in the narroweſt part, is not above three miles in breadth. This ſtraight was much dreaded by the ancients, on account of its rocks, currents, and whirlpool. The tides here flow very irregularly, and generally with great violence, from both the Tuſcan and Sicilian ſeas. The rocky promontory, anciently called Scylla, is now called Capo de Faro in Sicily. The whirlpool, anciently called Charibdis, and now Caloſara and La Rema, lies not far from Meſſina, near the bottom of the cape, and ſeems at preſent to be little dreaded.

Sicily is ſo hot a country, that, even in the beginning of January, the ſhade is found refreſhing: no chilling winds are felt, except for a few days in March. The only appearance of winter is towards the ſummit of Mount Ætna, where the ſnow falls, and is preſerved by the inhabitants. The air is, however, wholeſome, being refreſhed with ſea breezes on every ſide. Though the iſland appears as one entire rock, the ſoil is extremely fertile. Anciently it was ſtiled the granary or ſtore-houſe of Italy, and it is ſtill entitled to that appellation, producing, in great abundance, corn, wine, oil, fruits, ſugar, honey, wax, ſilk, and ſaffron.

The fertility of many of the plains, ſays Mr. Brydone, is truly aſtoniſhing, without incloſures, without manure, and almoſt without culture. It is with reaſon that this iſland was ſtyled *Romani imperii horreum*, the granary of the Roman empire. Were it cultivated, it would ſtill be the great granary of Europe. Pliny ſays, it yielded a hundred after one; and Diodorus, who was a native of the iſland, and wrote on the ſpot, aſſures us that it produced wheat and other grain ſpontaneouſly. The bowels of the earth yield gold, ſilver, iron, and other metals; together with minerals of various kinds, as alum, vitriol, ſalt-petre, and mineral ſalts.

The mountains in Sicily are, Ætna, the largeſt volcano in Europe; Erix, or Monte S. Giuliano, Madonia, Erei, Buſamar, and Monti di Peloro.

 Ætna,

Ætna, being the highest mountain in Sicily, is consequently first descried by mariners at a distance; to whom it has the appearance of a prodigious chimney, or a very large rugged pillar. The inhabitants, by an odd kind of composition, call it Monte Gibello, the Mount of Mounts: the ascent to it from Catania is thirty thousand paces; but on the side near Rondazza, only twenty thousand. It is unconnected with any of the other mountains; its figure is circular, and terminates in a cone. The lower parts of it are very fertile in corn and sugar-canes; the middle is covered with woods, olive-trees, vines, and shrubs, affording harbour for different animals; and a circle of snow appears round the mouth of the volcano the greatest part of the year. Sometimes it throws out calcined stones, and red hot cinders from an aperture of the breadth of five hundred paces; and sometimes it pours forth such torrents of burning matter as to produce alarming consequences. The most remarkable eruptions were in 1169, 1329, 1408, 1444, 1447, 1536, 1537, 1554, 1669, 1693, 1753, 1755, and 1783.

Swinburne asserts, that Pindar is the oldest writer extant who speaks of Ætna as a volcano. The first recorded eruption was in the time of Pythagoras: Plato was invited, by the younger Dionysius, to examine the state of the mountain after the sixth eruption. It threw up flames and lava near an hundred times between that period and the battle of Pharsalia; and it was particularly furious while Sextus Pompeius was adding the horrors of war to its devastations. Charlemagne was at Catania during one of the eruptions; that which happened in the year 1669 was horrible in the extreme. The lava burst forth at a place called Ricini, and ran in a stream fifty feet deep, and four miles broad, destroying all before it.

Ætna has never been measured with geometrical accuracy; the following dimensions are given by different authors: Height above the surface of the sea, 50,036 feet; 180 miles circumference at the base. Faujas de S. Fon, in his Volcans du Vivarais. Height 12,000 feet. Brydone's Tour to Sicily. Others make its height 2000 toises, and its superficies three hundred square miles. It is divided into circles or zones: the largest and lowest of which is called Piemontese, and occupies a breadth of eighteen miles of rich cultivation; the second, (Nemorosa) ascends six miles above it: the lower part of the third (Netta or Scoperta,) is covered with snow in winter only; but perpetual snows lie on the upper half of this sterile region, which measures two leagues in breadth, and terminates in the summit of the mountain.

The eruptions of Mount Ætna are generally preceded by an earthquake, producing devastation infinitely more to be deplored. By an earthquake on the 9th, 10th, and 11th, of January 1693, sixteen towns and eighteen manors, with the inhabitants and cattle, were entirely swallowed up, several other towns and villages laid in ruins, and nineteen thousand of the inhabitants perished in the general wreck. Another, which happened on the 5th of February, 1783, exhibited a calamitous scene: by that earthquake, a great part of the lower district of the city and port of Messina was destroyed, and much damage done to the lofty uniform buildings, called Palazzata. But the effects of this shock were not so fatal at Messina, or Reggio, as on the plain; for of thirty thousand, the supposed population of the city, only seven hundred were destroyed. The greatest number of

of fufferers were the inhabitants of the towns and countries fituated in the plain of Calabria Ultra. At Cafal Nuovo, the Princefs Gerace, with upwards of four thoufand of the inhabitants, were fwallowed up by the dreadful abyfs; at Baguara three thoufand and feventeen perifhed; Radicina and Palmi eftimated their dead at about three thoufand each; Terra Nova fourteen hundred; and Seminera a greater number. The fum total of the mortality occafioned by the earthquake, according to the returns in the fecretary of ftate's office in Naples, is thirty-two thoufand fix hundred and twenty-feven: but Sir William Hamilton is of opinion that forty thoufand, including ftrangers, may at leaft be allowed, without exaggeration.

Formerly, fays Mr. Brydone, there were a variety of wild beafts in the woody regions of Ætna; but, notwithftanding this advantage they had over the dogs and hunters, the number of thefe is now greatly reduced. They have ftill, however, the wild boar, the roe-buck, and a kind of wild goat; but the race of ftags, which was much celebrated, as well as that of bears, is thought to be extinct. Several places of the mountain are ftill named from thofe animals. The horfes and cattle of Mount Ætna were efteemed the beft in Sicily. The cattle are ftill of a large fize, and have horns of fuch a length, that they are preferved as curiofities in fome mufeums.

The mountains in this ifland produce emeralds, jafper, agate, porphyry, lapis-lazuli, and a ftone called catochite, of a greenifh fpeckled colour, which becomes foft by the warmth of a perfon's hand, and is faid to be an excellent antidote to the fting of fcorpions, and fome other poifonous infects. All the coafts afford good fifheries, efpecially for tunnies; the cattle in the ifland are very fine, and game of all kinds is found in great abundance. Confiderable profits arife here from filk, the cultivation of which was firft introduced, in 1130, by M. Roger; who, returning from an expedition into the Holy-Land, in which he had taken Athens, Corinth, and Thebes, brought back with him fome perfons well acquainted with the management of that article: hence the growth and manufacture of it have been encouraged in Naples, the Milanefe, Spain, and the French provinces bordering on Italy. Abundance of coral is found upon the coaft. Great quantities of the commodities of this ifland, and particularly of raw and manufactured filk, are exported from Meffina, where a conful from almoft every nation in Europe refides, to protect and regulate the trade of his country.

The rivers here have but a fhort courfe, and confequently few of them are navigable: they defcend precipitately from the mountains. The principal of them are the Giaretta, anciently Symetus, the Salfo, the Belicis, the Termini, the Ragufa, and the Nifi. Lake Biveri is the only piece of water entitled to that term: the Giaretta, fays Mr. Brydone, was celebrated by the poets under the name of Symetus. The nymph Thalia, after her amour with Jupiter, is fuppofed to have been changed into this ftream: and, to avoid the refentment of Juno, funk under the ground near Mount Ætna, and continued her fubterraneous courfe to the fea. This river takes its rife on the north fide of Ætna, and, paffing the weft fkirts of the mountain, falls into the fea near the ruins of the ancient Morgantio. It no longer finks under the ground, as it did formerly.

Aborigines, Cyclops, Sicani, and Siculi, are names given to nations which occupied this country fucceffively: then came the Phœni-

cians from Tyre and Sidon. Next came colonies from Greece, who ſeized upon the maritime parts of this fertile iſland, abounding in harbours: the luxuriant ſoil ſupplied them with rich articles of exportation; and by commerce, their numbers, wealth, and power, increaſed in rapid progreſſion; while the old inhabitants, confined to the inner mountainous regions, remained in an uncivilifed ſtate. By degrees, their name, race, and character, became undiſtinguiſhably blended with that of their invaders. The Greeks were at length obliged to ſhare this country with the Carthaginians: theſe were ſubdued or expelled by the Romans, who reduced it into the form of a province. It followed the fortune of Italy in its ſeveral revolutions, till the Sicilian Veſpers in 1282, when the natives maſſacred the French, who had then the dominion of the iſland. The Spaniards afterwards got poſſeſſion of it, and continued maſters of it till 1707, when they were expelled by the Imperialiſts. At the peace of Utrecht, Sicily was ceded to Victor, Duke of Savoy; but the Emperor Charles VI. forced him to relinquiſh it, and take that of Sardinia as an equivalent. But, as the Spaniards had not had any concern in theſe bargains, they made a ſudden attempt to recover this fine iſland; in which they failed, through the vigilance of the Engliſh admiral Byng. He deſtroyed their fleet in 1718, and compelled them, for a time, to lay aſide their project. In 1734, the Spaniſh court reſumed their deſign with ſucceſs. The infant Don Carlos drove the Germans out, and was crowned king of the Two Sicilies at Palermo. When he paſſed into Spain, to take poſſeſſion of that crown, he transferred the Sicilian diadem to his ſon Ferdinand III. of Sicily, and the Fourth of Naples.

This iſland, ſays Mr. Swinburne, is governed by a viceroy, in whoſe abſence the Archbiſhop of Palermo is regent. The general aſſembly of parliament is compoſed of archbiſhops, biſhops, abbots, and priors, to the number of ſixty-ſix: theſe form the Bracchio or Eccleſiaſto. Fifty-eight princes, twenty-ſeven dukes, thirty-ſeven marquiſes, twenty-ſeven counts, one viſcount, and ſeventy-nine barons, form the militare, and the demaniale conſiſts of forty-three repreſentatives of free towns. Out of each bracchio four deputies are choſen to conduct public buſineſs: but the viceroy, the Prince of Butera, and the Prætor of Palermo, are always the three firſt. There are many titled perſons, who have no ſeat in the aſſembly: of theſe there are ſixty-two princes, fifty-five dukes, eighty-ſeven marquiſes, one count, and two hundred and eighty-two other feudatories.

The Roman Catholic is the eſtabliſhed religion of the iſland, but the Jews are permitted to reſide in it. The eccleſiaſtical government is compoſed of three biſhops and ſeven archbiſhops. Here is a ſovereign eccleſiaſtical tribunal, which judges of all matters and diſputes in which the clergy are concerned. The number of churches, convents, and religious foundations, is very conſiderable; the buildings of which are handſome, and the revenues great. Here are a great number of curious antiquities.

We are informed by Mr. Swinburne, that the principal trade of the iſland is carried on at Palermo and Meſſina.

The environs of Girgenti abound with almonds, but other ports alſo furniſh a conſiderable quantity. Lipari gives raiſins and currants, but of a quality inferior to thoſe of Calabria. Sicily alone produces

piſtachio nuts. Carob beans are alſo an article of trade. Two thouſand cheſts of oranges are ſhipped annually at Meſſina. A large quantity of barilla is exported from the ſouthern coaſt. The quantity ſent to England is near the half of the quantity ſent thither from Spain. Meſſina ſends off ſix thouſand cheſts of pickled lemons, and the reſt of the kingdom about as much more; two hundred and eighty barrels of lemon-juice, weighing ten ſalme each; and twenty-ſeven hundred-weight of bergamot juice.

There are many other objects of export trade, but theſe are the moſt conſiderable.

The Sicilians, ſays Mr. Brydone, are animated in converſation; and their action, for the moſt part, is ſo juſt and expreſſive of their ſentiments, that, without hearing what is ſaid, a perſon may comprehend the ſubject of their diſcourſe. We uſed to think the French and Neapolitans (ſays the ſame writer) great adepts in this art, but they are much outdone by the Sicilians, both in the variety and juſtice of their geſticulation. The origin of this cuſtom they carry ſo far back as the time of the earlieſt tyrants of Syracuſe, who, to prevent conſpiracies, had forbid their ſubjects, under the moſt ſevere penalties, to be ſeen in parties talking together. This obliged them to invent a method of communicating their ſentiments by dumb ſhow, which they pretend has been tranſmitted from generation to generation ever ſince.

The Sicilian ladies marry very young, and frequently live to ſee the fifth or ſixth generation. In general, they are ſprightly and agreeable; but a Piedmonteſe or an Engliſhman would declare them very ordinary. Nothing is ſo vague as our ideas of female beauty: they change in every climate; and the criterion is no where to be found. The ladies have remarkable fine hair, and they know how to dreſs and adorn it to the greateſt advantage.

The Sicilians have always had the character of being very amorous, and not without reaſon. The whole nation are poets, even the peaſants; and a man ſtands a poor chance for a miſtreſs, who is not capable of celebrating her praiſes. It is generally allowed, that the paſtoral poetry had its origin in this iſland; and Theocritus, after whom they ſtill copy, will ever be looked upon as the prince of paſtoral poets. And indeed in muſic too as well as poetry, the ſoft amorous pieces are generally ſtyled *Siciliani*: theſe they uſed to play all night under their miſtreſs's windows, to expreſs the delicacy of their paſſion; but ſerenading is not ſo much in faſhion as it was during the time of their more intimate connection with Spain, when it was ſaid by one of their authors, that no perſon could paſs for a man of gallantry who had not a cold, and was ſure never to ſucceed in making love unleſs he courted in a hoarſe voice.

PYROTECHNY; OR THE ART OF PREPARING ALL KINDS OF FIRE-WORKS.—Continued from p. 185.

TO MAKE FIRE-PUMPS.

CASES for fire-pumps are made as thoſe for tourbillons; only they are paſted inſtead of being rolled dry. Having rolled and dried your caſes, fill them: firſt put in a little meal-powder, and then a ſtar; on which ram lightly a ladle or two of compoſition, then a little meal-powder, and on that a ſtar, then again compoſition; and ſo on till

till you have filled the case. Stars for fire-pumps; should not be round; but must be made either square, or flat and circular, with a hole through the middle: the quantity of powder for throwing the stars must increase as you come near the top of the case; for, if much powder be put at the bottom, it will burst the case. The stars must differ in size in this manner: Let the star which you put in first be about ½ less than the bore of the case; but let the next star be a little larger, and the third star a little larger than the second, and so on: let them increase in diameter till within two ot the top of the case, which two must fit in tight. As the loading of fire-pumps is somewhat difficult, it will be necessary to make two or three trials before you depend on their performance: when you fill a number of pumps, take care not to put in each an equal quantity of charge between the stars, so that, when they are fired, they may not throw up too many stars together. Cases for fire-pumps should be made very strong, and rolled on 4 or 8 oz. formers, 10 or 12 inches long each.

Vertical Scroll Wheel.—This wheel may be made of any diameter, but must be constructed in the following manner. Have a block made of a moderate size, in which fix four flat spokes, and on them fix a flat circular fell of wood; round the front of this fell place port-fires; then on the front of the spokes form a scroll, either with a hoop or strong iron wire; on this scroll tie cases of brilliant fire, in proportion to the wheel, head to tail. When you fire this wheel, light the first case near the fell; then, as the cases fire successively, you will see the circle of fire gradually diminish: but whether the illuminations on the fell begin with the scroll or not, is immaterial, that being left entirely to the maker. This wheel may be put in the front of a regulated piece, or fired by itself, occasionally.

Pin-Wheels.—First roll some paper pipes, about 14 inches long each; these pipes must not be made thick of paper, two or three rounds of elephant paper being sufficient. When your pipes are thoroughly dried, you must have a tin tube 12 inches long, to fit easy into the pipes; at one end of this tube fix a small conical cup, which cone is called a funnel; then bend one end of one of the pipes, and put the funnel in at the other as far as it will reach, and fill the cup with composition: then draw out the funnel by a little at time, shaking it up and down, and it will fill the pipe as it comes out. Having filled some pipes, have some small blocks made, about one inch diameter and half an inch thick: round one of these blocks wind and paste a pipe, and to the end of this pipe join another; this must be done by twisting the end of one pipe to a point, and putting it into the end of the other with a little paste: in this manner join four or five pipes, winding them one upon the other so as to form a spiral line. Having wound on your pipes, paste two slips of paper across them to hold them together: besides these slips of paper, the pipes must be pasted together.

There is another method of making these wheels, viz. by winding on the pipes without paste, and sticking them together with sealing-wax at every half turn; so that, when they are fired, the end will fall loose every time the fire passes the wax, by which means the circle of fire will be considerably increased. The formers for these pipes are made from 1½ to 4-16ths of an inch diameter; and the composition for them is as follows: Meal-powder 8 oz. saltpetre 2 oz. and sulphur 1: among these ingredients may be mixed a little steel-filings

filings or the duſt of caſt iron: this compoſition ſhould be very dry, and not made too fine, or it will ſtick in the funnel. Theſe wheels may be fired on a large pin, and held in the hand with ſafety.

Fire-globes.—There are two ſorts of fire-globes; one with projected caſes; the other with the caſes concealed, thus: Have a globe made of wood, of any diameter you chooſe, and divide the ſurface of it into 14 equal parts, and at each diviſion bore a hole perpendicular to the centre: theſe holes muſt be in proportion to the caſes intended to be uſed; in every hole except one, put a caſe filled with brilliant or any other charge, and let the mouths of the caſes be even with the ſurface of the globe; then cut in the globe a groove, from the mouth of one caſe to the other, for leaders which muſt be carried from caſe to caſe, ſo that they may all be fired together; this done, cover the globe with a ſingle paper, and paint it. Theſe globes may be uſed to ornament a building.

Fire-globes with projected caſes are made thus: Your globe being made with 14 holes bored in it as uſual, fix in every hole except one, a caſe, and let each caſe project from the globe two-thirds of its length; then clothe all the caſes with leaders, ſo that they may all take fire at the ſame time. Fire globes are ſupported by a pintle, made to fit the hole in which there is no caſe.

To thread and join Leaders, and place them on different Works.

Joining and placing leaders is a very eſſential part of fire-works, as it is on the leaders that the performance of all complex works depends; for which reaſon the method of conducting pipes of communication ſhall be here explained in as plain a manner as poſſible. Your works being ready to be clothed, proceed thus: Cut your pipes of a ſufficient length to reach from one caſe to the other; then put in the quick-match, which muſt always be made to go in very eaſy; when the match is in, cut it off within about an inch of the end of the pipe, and let it project as much at the other end; then faſten the pipe to the mouth of each caſe with a pin, and put the looſe ends of the match into the mouths of the caſes, with a little meal-powder: this done to all the caſes, paſte over the mouth of each two or three bits of paper. The preceding method is uſed for large caſes, and the following for ſmall, and for illuminations: Firſt thread a long pipe; then lay it on the tops of the caſes, and cut a bit of the under ſide, over the mouth of each caſe, ſo that the match may appear: then pin the pipe to every other caſe; but before you put on the pipes, put a little meal-powder in the mouth of each caſe. If the caſes thus clothed are port-fires on illuminated works, cover the mouth of each caſe with a ſingle paper; but if they are choaked caſes, ſituated ſo that a number of ſparks from other works may fall on them before they are fired, ſecure them with three or four papers, which muſt be paſted on very ſmooth, that there may be no creaſes for the ſparks to lodge in, which often ſet fire to the works before their time. Avoid as much as poſſible placing the leaders too near, or one acroſs the other ſo as to touch, as it may happen that the flaſh of one will fire the other; therefore if your works ſhould be ſo formed that the leaders muſt croſs or touch, be ſure to make them very ſtrong, and ſecure at the joints, and at every opening.

When a great length of pipe is required, it muſt be made by joining ſeveral pipes in this manner: Having put on one length of

 match

match as many pipes as it will hold, paſte paper over every joint; but, if a ſtill greater length is required, more pipes muſt be joined, by cutting about an inch off one ſide of each pipe near the end, and laying the quick-match together, and tying them faſt with ſmall twine; after which, cover the joining with paſted paper.

Placing Fire-works to be exhibited.

Nothing adds more to the appearanee of fire-works than the placing them properly; though the manner of plaeing them chiefly depends on the judgment of the maker. The following are the rules generally obſerved, whether the works are to be fired on a building or on ſtands: If they are a double ſet, place one wheel of a ſort on each ſide of the building; and next to each of them, towards the centre, place a fixed pieee, then wheels, and ſo on; leaving a ſufficient diſtance between them for the fire to play from one without burning the other. Having fixed ſome of your works thus in front, place the reſt behind them, in the centre of their intervals. The largeſt piece, which is generally a regulated or tranſparent piece, muſt be placed in the centre of the building, and behind it a ſun, which muſt always ſtand above all the other works. A little before the building, or ſtands, place your large gerbes; and at the back of the works fix your marron batteries, *pots des aigrettes*, *pots des brins*, *pots de ſauciſſons*, air-ballons, and flights of rockets. The rocket ſtands may be fixed behind, or anywhere elſe, ſo as not to be in the way of the works. Single collections are fired on ſtands; which ſtands are made in the ſame manner as theodolite ſtands, only the top part muſt be long or ſhort occaſionally; theſe ſtands may be fixed up very ſoon without much trouble.

Order of Firing.

1.	Two ſignal		rockets
2.	Six ſky		
3.	Two honorary		
4.	Four caduceus		
5.	Two	vertical	wheels illuminated
6.		ſpiral	
7.		tranſparent ſtars	
8.	A line rocket of five changes		
9.	Four tourbillons		
10.	Two	horizontal wheels	
11.		air balloons illuminated	
12.		Chineſe fountains	
13.		regulating pieees of four mutations each	
14.		pots des aigrettes	
15.	Three large gerbes		
16.	A flight of rockets		
17.	Two	balloon wheels	
18.		caſeades of brilliant fire	
19.	Twelve ſky-rockets		
20.	Two	illuminated yew trees	
21.		air-balloons of ſerpents, and 2 compound	
22.	Four tourbillons.		
23.	Two	Fruiloni wheels	
24.		illuminated globes with horizontal wheels	

25. One

25. One pot des fauciffons
26. Two plural wheels
27. Marron battery
28. Two chandeliers illuminated
29. Range of pots des brins
30. Twelve fky-rockets
31. Two yew-trees of fire
32. Neft of ferpents
33. Two doubleconesilluminated
34. Regulating piece of feven mutations, viz.
 1. Vertical wheel illuminated
 2. Golden glory
 3. Octagon vertical wheel
 4. Porcupine's quills
 5. Crofs fires
 6. Star-piece with brilliant rays
 7. Six vertical wheels
35. Brilliant fun
36. Large flight of rockets

When water-works are to be exhibited, divide them into feveral fets, and fire one fet after every fifth or fixth change of land and air works. Obferve this rule in firing a double fet of works: Always begin with fky-rockets, then two moveable pieces, then two fixed pieces, and fo on; ending with a large flights of rockets, or a marron battery: if a fingle collection, fire a fixed piece after every wheel or two, and now and then fome air and water works.

Fountain of Sky-rockets.—Procure a perpendicular poft, 16 feet high from the ground, and 4 inches fquare. Let the rail, or crofs piece, be 1 foot 6 inches long, 3 inches broad, and 1 thick. The rail at bottom muft be 6 feet long, 1 foot broad, and 1 inch thick. The two fides, which ferve to fupply the rails, are 1 foot broad at bottom, and cut in the front with a regular flope, to 3 inches at top; but their back edges muft be parallel with the front of the pots. The breadth of the rail, will be determined by the breadth of the fides: all the rails muft be fixed at 2 feet diftance from each other, and at right angles with the pots. Having placed the rails, bore in the bottom rail 10 holes at equal diftances, large enough to receive the ftick of a one-pound rocket: in the back edge of this rail cut a groove from one end to the other, fit to contain a quick-match; then cut a groove in the top of the rail, from the edge of each hole, into the groove in the back: in the fame manner cut in the fecond rail 8 holes and grooves; in the third rail, 6 holes and grooves; in the fourth rail, 4 holes and grooves; and in the top rail, 2 holes and grooves. Place a rail with holes in it to guide the ends of the rocket-fticks: this rail muft be fixed 6 feet from the rail at bottom. The fountain frame being thus made, prepare your rockets thus: Tie round the mouth of each a piece of thin paper, large enough to go twice round, and to project about 1½ inch from the mouth of the rocket, which muft be rubbed with wet meal-powder; in the mouth of each rocket put a leader, which fecure well with the paper that projects from the mouth of the cafe: thefe leaders muft be carried into the grooves in the back of the rails, in which lay a quick-match from one end to the other, and cover it with pafted paper: holes muft be made in the rail at bottom, to receive the ends of the fticks of the rockets, and fo on to the fourth rail; fo that the fticks of the rockets at top will go through all the rails. The rockets being fo prepared, fix a gerbe, or white flower-pot, on each rail, before the poft, with their mouths inclining a little forwards: thefe gerbes muft be lighted all at once. Behind or before each gerbe, fix a cafe of brilliant or flow fire: thefe cafes muft be filled fo that they may burn one out after the other, to regulate the fountain; which may be done by carrying a leader from the end of each flow or brilliant

 fire,

fire, into the groove in the back of each rail. Different fixed rockets may be uſed in theſe fountains; but it will be beſt to fill the heads of the rockets on each rail with different ſorts of things, in this manner; thoſe at top with crackers, the next with rains, the third with ſerpents, the fourth with tailed ſtars, and the laſt flight with common or brilliant ſtars.

Palm Tree.—This piece, though made of common fires and of a ſimple conſtruction, has a very pleaſing effect; owing to the fires interſecting ſo often, that they reſemble the branches of trees. Procure a perpendicular poſt, of any thickneſs, ſo that it is ſufficiently ſtrong to hold the caſes; let the diſtance of the arms be 2 feet 6 inches, and let the length of each croſs piece be 2 feet; on each end of each fix a five pointed ſtar: then fix, on pegs made on purpoſe, 12-inch half-pound caſes of brilliant fire. All the caſes and ſtars muſt be fired at once. This piece ſhould be fixed high from the ground.

Illuminated Pyramid, with Archimedian Screws, a Globe, and vertical Sun,

May be of any height; the ſpace between the rails muſt be 6 inches, and the rails as thin as poſſible: in all the rails ſtick port-fires at 4 inches diſtance. The Archimedian ſcrews, are nothing more than double ſpiral wheels, with the caſes placed on their wheels horizontally inſtead of obliquely. The vertical ſun, need not conſiſt of more than 12 rays, to form a ſingle glory. The globe at top muſt be made in proportion to the pyramid; which being prepared according to the preceding directions, place your leaders ſo that all the illuminating port fires, ſcrews, globe, and ſun, may take fire together. The pyramid muſt be ſupported by the two ſides, and by a ſupport brought from a pole, which muſt be placed two feet from the back of the pyramid, that the wheels may run free.

Roſe piece, and Sun.—A roſe-piece may be uſed for a mutation of a regulated piece, or fired by itſelf: it makes the beſt appearance when made large; if its exterior diameter be 6 feet, it will be a good ſize. Let the exterior ſell be made of wood, and ſupported by 4 wooden ſpokes: all the other parts, on which the illuminations are fixed, muſt be made of ſtrong iron wire: on the exterior ſell place as many half-pound caſes of brilliant charge as you think proper, but the more the better; for the nearer the caſes are placed, the ſtronger will be the rays of the ſun: the illuminations ſhould be placed within 3 inches of each other: they muſt be all fired together, and burn ſome time before the ſun is lighted; which may be done by carrying a leader from the middle of one of the illuminations, to the mouth of one of the ſun caſes.

Tranſparent Stars with illuminated Rays.—Firſt make a ſtrong circular back or body of the ſtar, 2 feet diameter, to which you fix the illuminated rays: in the centre of the front of the body fix a ſpindle, on which put a double triangular wheel, 6 inches diameter, clothed with 2-ounce caſes of brilliant charge: the caſes on this wheel muſt burn but one at a time. Round the edge of the body nail a hoop made of thin wood or tin: this hoop muſt project in front 6 or 7 inches: in this hoop cut three or four holes to let out the ſmoke from the wheel. The ſtar and garter may be cut out of ſtrong paſteboard or tin, made in this manner: Cut a round piece of paſteboard or tin, 2 feet diameter, on which draw a ſtar, and cut it out; then over the vacancy paſte Perſian ſilk; paint the letters yellow; 4 of the

the rays yellow, and 4 red; the crofs in the middle may be painted half red and half yellow, or yellow and blue. This tranfparent ftar muft be faftened to the wooden hoop by a fcrew, to take off and on; the illuminated rays are made of thin wood, with tin fockets fixed on their fides within 4 inches of each other; in thefe fockets ftick illuminating port-fires; behind the point of each ray fix a half-pound cafe of grey, black, or Chinefe, fire. The illuminated rays are to be lighted at the fame time as the triangular wheel, or after it is burnt out; which may be done by a tin-barrel being fixed to the wheel, after the manner of thofe in the regulated pieces. Into this barrel carry a leader from the illuminated rays, through the back of the ftar; which leader muft be met by another, brought from the tail of the laft cafe on the wheel.

Tranfparent Table Star illuminated.—The centre frame muft be 4 feet fquare; and in this fquare fix a tranfparent ftar. This ftar may be painted blue, and its rays made as thofe of the flaming ftars defcribed before. The wheel for this ftar may be compofed of different coloured fires, with a charge or two of flow fire; the wheels may be clothed with any number of cafes, fo that the ftar-wheel confift of the fame: the illuminating port-fires, which muft be placed very near each other on the frames, muft be fo managed as to burn as long as the wheels, and lighted at the fame time.

The regulated Spiral Piece, with a projected Star-wheel illuminated.—This piece may be thus made. Procure a block of 8 inches diameter; in this block fcrew 6 iron fpokes, which muft ferve for fpindles for the fpiral wheels: thefe wheels are made as ufual, each 1½ foot diameter, and 3 feet in height: the fpindles muft be long enough to keep the wheels 4 or 5 inches from one another; at the end of each fpindle muft be a fcrew-nut, on which the wheels that hang downwards will run; and on the fpindles which ftand upwards muft be a fhoulder, for the blocks of the wheels to run on.

The projected ftar-wheel muft turn on the fame fpindle on which the large block is fixed; this fpindle muft be long enough to allow the ftar-wheel to project a little before the fpiral wheels: the exterior diameter of the ftar-wheel muft be 3 feet 5. On this wheel fix 3 circles of iron wire, and on them port-fires; on the block place a tranfparent ftar, or a large 5-pointed brilliant ftar. The cafes on this wheel may burn 4 at once, as it will contain near twice the number of one of the fpiral wheels: the cafes on the fpiral wheels muft be placed parallel to their fells, and burn two at a time.

A Figure-piece illuminated with five-pointed Stars.—The conftruction of this piece is very eafy. The vertical wheel in the centre muft be 1 foot diameter, and confift of 6 four-ounce cafes of different coloured charge, which cafes muft burn double: on the frames fix 5 pointed brilliant or blue ftars, rammed 4 inches with compofition: let the fpace between each ftar be 8 inches; at each point fix a gerbe, or cafe of Chinefe fire. When to be fired, let the gerbe, ftars, and wheel, be lighted at the fame time.

The Star-wheel illuminated.—This beautiful piece hath its exterior fell made of wood, 3 feet 6, or 4 feet, diameter; within this fell, form with iron wire 3 circles, one lefs than the other, fo that the diameter of the leaft may be about 10 inches: place the port fires on thefe fells with their mouths inclining outwards, and the port-fires on the points of the ftar with their mouths projecting in front: let the

the exterior fell be clothed with 4-ounce cafes of grey charge: thefe cafes muft burn 4 at a time, and be lighted at the fame time as the illuminations.

Pyramid of Flower-pots.—This curious piece muft be made thus. Let the height be 6 feet; and from one rail to the other, 2: on the bottom rail fix 5 paper mortars, each $3\frac{1}{2}$ inches diameter; thefe mortars load with ferpents, crackers, ftars, &c. In the centre of each mortar fix a cafe of fpur-fire: on the fecond rail fix 4 mortars, fo as to ftand exactly in the middle of the intervals of them on the bottom rail; on the third rail place 3 mortars; on the fourth, 2; and on the top of the poft, 1: the bottom rail muft be 6 feet long: all the mortars muft incline a little forwards, that they may eafily difcharge; and the fpur-fires rammed exactly alike, that the mortars may all be fired at the fame time. Having prepared your pyramid according to the preceding directions, carry pipes of communication from one fpur-fire to the other.

The illuminating Regulating Piece.—Erect flat wooden fpokes, each 5 feet long: at the end of each place a vertical wheel, 10 inches diameter, clothed with 6 four-ounce cafes of brilliant fire: thefe cafes muft burn but 1 at a time: on two of the fpokes of each wheel place 2 port-fires, which muft be lighted with the firft cafe of the wheel; on each fpoke behind the wheels, place 6 cafes of the fame fize with thofe on the wheels: thefe cafes muft be tied acrofs the fpokes with their mouths all one way, and be made to take fire fucceffively one after the other, fo that they may affift the whole pieces to turn round.

The diameter of the large wheel muft be $2\frac{1}{2}$ feet; and its fell made of wood, which muft be fixed to the large fpokes: on this wheel place 24 cafes of the fame fort with thofe on the fmall wheels; thefe cafes muft burn 4 at a time: in this wheel make 3 circles with iron wire, and on them place illuminating port-fires; the ftar-points on the large fpokes may be made of thin afh-hoops; the diameter of thefe points clofe to the centre-wheel muft be 11 inches: on thefe points place port-fires, at $3\frac{1}{2}$ inches diftance one from the other.

(To be concluded in our next.)

MEDITATIONS ON A NEWSPAPER.

EVERY man, when he wakes in the morning, finds that the reflections fuggefted by the preceding day have been, if not wholly obliterated, at leaft fufpended by fleep; that new topics of converfation are wanting, and that furprife is a tip-toe for new calls; that he is unwilling to recur to the bufinefs of the preceding day, becaufe it has been exhaufted, or afhamed to recollect it becaufe it has difappointed him. A family thus met together would drink the tea of Lethe, and eat the toaft of taciturnity, were they not happily relieved from torpor of thought and immoveability of tongue, by the entrance of a newfpaper. It is poffible, indeed, that the weather might furnifh a brief fubject of debate; but the wind muft blow a hurricane, and the rain defcend in torrents, to be worth more than a moment's converfation. When the newfpaper appears, however, all Europe is united to refrefh the languid memory, to quicken the dull thought, and give expedition to the communicative tongue. Even the breakfaft-table is indebted to the prefence of this lively gueft.

gueſt. The tea acquires a more odoriferous flavour; the toaſt is handed about with a quicker velocity; and the ſugar and butter, though leſs white and ſweet than could be wiſhed, eſcape without cenſure in the multiplicity of reflections which the newſpaper ſuggeſts.

No publication ſurely was ever contrived ſo fertile in ſources of reflection to thoſe who chooſe to think, or of converſation to thoſe who prefer the humbler, though more noiſy, buſineſs of talking. Firſt, a long liſt of expenſive amuſements preſents itſelf, fraught with every tempting inducement. Here it is important to obſerve how a play is caſt, what great performers are concerned, and what farce or entertainment is to follow; if a concert, what pieces are to be performed, and by whom; if an opera, whether the divine Signor ——, or the more divine Signora ——, bears a part. From amuſements there is a tranſition to works of charity, to ſubſcriptions of names and ſums of money for benevolent purpoſes; whether the arrangement here be judicious, or whether theſe ought not to precede amuſements, I ſhall not ſtop to enquire. Perhaps the editor truſts to the good ſenſe of his readers, that what he mixes heterogeneouſly, they will ſeparate and arrange judiciouſly. Otherwiſe, there would appear to be a deſigned confuſion in the advertiſement-part of a paper, which would not be eaſily reconciled to common ſenſe, and would ſerve rather to perplex our reflections than to call them forth to any uſeful purpoſe. With advertiſements a paper uſually begins and ends, and it is proper therefore that we conſider them firſt. They deſerve this preference, too, on another account. Attentively obſerved, they will be found a very correct picture of the times, and a very faithful record of the transfer of property, whether by ſale or fraud.

I have hinted that their arrangement is apparently confuſed. We ſee books and pills, eſtates and lap-dogs, perfumery and charity ſermons, crowded together by one of thoſe accidents by which we may ſuppoſe chaos would be produced. Here a diſconſolate widow advertiſes that ſhe carries on buſineſs as uſual for the benefit of her orphan family; and there a lady of quality offers five guineas for the recovery of a lap-dog which 'anſwers to Chloe.' A perſon wants to borrow five thouſand pounds upon undeniable ſecurity; and a ſtable-keeper offers to ſell a horſe for a hundred guineas upon his bare word. Servants want places, in which "wages are no object;" and a place under government may be heard of, where wages are the only object. Humphrey Jenkins loſt his pocket-book in coming out of the playhouſe; and Sarah Thomſon has eloped from her huſband, who will pay no debts of her contracting, "as witneſs his mark." In one place, we have notice of a main of cocks; and juſt by it, the candidates for a vacant chaplainſhip are deſired to apply.

But of all perſons "that on earth do dwell," the ſick find the greateſt relief in a newſpaper. Why it is that diſeaſes ſhould prevail in ſpite of all the infallible medicines that are, in a manner, thruſt down the throats of the ſick, is to me aſtoniſhing. It would appear that the only diſorder patients are troubled with, is an incurable obſtinacy, which prevents them from taking medicines that have "cured thouſands, who have been diſmiſſed from the hoſpitals in a moſt deplorable ſtate." Do we not find that, in ſome caſes, one ſingle box of pills will effect a cure, and in others, that the patient may be relieved by the ſmell only? Will not theſe medicines "keep good in all climates?" and is it not notorious that they perform their

cures,

cures, "without loſs of time, or hindrance of buſineſs?" Why then do we hear of the ſick and the dying? Why are not our hoſpitals turned into almſhouſes for decayed phyſicians and apothecaries, who have no buſineſs?

Nor is our information reſpecting the preſervation of health leſs important than that for the cure of diſeaſe. If we turn our eyes to the ſales of houſes and eſtates, we ſhall find that they are all ſituated in counties remarkably healthy, with plenty of fine ſoft water, charmingly ſheltered, richly wooded, hill and dale, meadow and grove, where the eaſt wind is not permitted to chill, nor the thunder to roll. Theſe, it is true, are chiefly calculated for perſons who can afford to pay rather extravagantly for the preſervation of health; but this can be no object with thoſe who know that health is the greateſt of all bleſſings, and that in this way it may be handed down to the lateſt poſterity. The clergy, I muſt obſerve, are particularly intereſted in theſe advertiſements. The rectories are all ſituated "in remarkably healthy ſpots," and "the preſent incumbent is nearly eighty years old."—What greater encouragement to a man who wiſhes to do good extenſively, and to do it long, eſpecially where "it lies in the vicinity of a pack of hounds"—a circumſtance of which we are frequently reminded, although the connexion between the buſineſs of the pulpit and the ſports of the field is not quite ſo obvious as might be expected from the eloquence of our faſhionable auctioneers—a race of men to whoſe inventive genius we owe the converſion of horſe-ponds into beautiful ſheets of water, ditches into canals, and gibbets into hanging woods; but the ableſt men cannot do every thing. There are bounds, even in theſe times, to human genius.

Now, when all theſe ſubjects are introduced at the breakfaſt-table, what a copious ſource of converſation for the reſt of the day, eſpecially if any of thoſe ſhould create a deſire to be a bidder, or purchaſer. What hopes, what fears, what enquiries, what conſultations! But this is not neceſſary to the pleaſure a newſpaper affords. A man may give a very able account of an eſtate without the leaſt deſire of purchaſing it, and a whole family may diſpute on the merit of an entertainment, which not one of the party means to partake of. It is poſſible to compaſſionate the diſtreſſes of an orphan family, without contributing ſixpence to their relief; and even to read of the cures performed by a "famous ſyrup," without deſiring to taſte a drop of it. Converſation and action are two different things; and, if a newſpaper furniſhes the former, it is doing much.

Before quitting the advertiſements, it may be neceſſary to mention two deſcriptions of perſons, who never appear to meet, and yet who never ought to be ſeparate, namely, thoſe who "are deſirous to lend money," and thoſe who are equally "deſirous to borrow it." Why people that might be ſo mutually ſerviceable, ſhould ſtand in oppoſite columns in a newſpaper, is very extraordinary.—There muſt be ſome ſecret in this, which we, who neither want to borrow nor lend, are unacquainted with. That the party wiſhing to borrow ſhould conceal his name, is eaſily accounted for; prudential reaſons require that a man's temporary embarraſſments ſhould be concealed as much as poſſible; but that he who "would be happy to lend," or, as it is ſometimes called, "to accommodate," ſhould court obſcurity, is not ſo eaſily explained. If it be from a motive of modeſty, it is highly

highly praife-worthy, as modefty always is, but it prevents us from handing down the names of thefe benevolent perfons to future ages, as they deferve. Pofterity can only know that all the letters of the alphabet, from A. B. to X. Y. have been eminent for their benevolence in accommodating diftreffed perfons with 'fums of money lying at their bankers from 500l. to 20,000l.' And thus I clofe my meditations on the advertifements. I might mention more, indeed; but, as the poet fays,

> The reft appears a wildernefs of ftrange
> But gay confufion; rofes for the cheeks,
> And lilies for the brows of faded age,
> Teeth for the toothlefs, ringlets for the bald,
> Heaven, earth, and ocean, plunder'd of their fweets,
> Nectareous effences, Olympian dews,
> Sermons, and city feafts, and fav'rite airs,
> Ætherial journies, fubmarine exploits,
> And Katterfelto, with his hair on end
> At his own wonders, wond'ring for his bread. COWPER.

But yet all thefe would probably fail of their effect, were they the only contents of a newfpaper. There are thoufands who are indifferent to a change of fituation, who are confined to bufinefs and cannot leave it, who are gormandizing a breakfaft and lothe medicine, who are blooming, and want no wafhes, who are cheerful, and want no amufements, or who are charitable, and want no puffs and quackery to prompt their benevolence; yet who want all that the reft of a newfpaper fupplies, that dear and exquifite food, news, the daily bread of curiofity, and the panacea of all the evils arifing from dullnefs and filence, the fovereign fpecific that applies to every man's cafe.

This part of a paper, though I have confidered it laft, is generally confulted firft, and what can equal the gladfome inquifitivenefs that appears in the eye, when it firft rolls gently over the columns of a frefh newfpaper! Such is the variety of this department, and fuch the attachment of every man to his favourite purfuit, that a tolerable guefs may be formed of what a man is, by attending to what he firft reads in a paper. The fturdy politician, indeed, is a general reader. He can find out a political allufion in every paragraph. If a lady of quality makes a falfe ftep, he can defcant on the privileged orders; and, if the price of bread has rifen, he can cenfure parliament for the infufficiency of the corn-laws. But others confine themfelves to their favourite articles; the court-news delight the man of fafhion, becaufe he knows the parties; the ladies are anxious for marriages and births, becaufe they may know the parties; the young and gay are for the fafhionable tattle of marriages, divorces, duels, new dreffes, elopements, and other articles of the amufing kind; while the grave citizen cafts a folemn glance at the price of ftocks, wifhes he had bought in, or hopes he foon may be able to fell out. And there are a pretty numerous clafs to whom robberies, burglaries, murders, and picking of pockets, afford a confiderable gratification —in the detail.

A newfpaper being thus perufed, by every man according to his tafte, the day is begun with a proper fund for converfation. The wheels are again fet a-going, and the dulleft has fomething to fay, or

ſome remark to make on what he has read. If newſpapers, then, are undervalued, it is either becauſe they are common and cheap, and we know that things which are common and cheap are always undervalued. (But this, perhaps, may not always be the caſe. In point of cheapneſs, the objection has been gradually removing for ſome time.)—Or perhaps the reaſon is, that they are expected as conſtantly as the returns of day and night, and therefore we ſet the leſs value upon them. To appreciate their true value, therefore, we have only to ſuppoſe that they were totally to be diſcontinued for a month, or even a week.—I turn with horror from the frightful idea! I deprecate ſuch a ſhock to the circulation of table-talk. It would operate more unfavourably than the gloom of November is ſaid by foreigners to operate on the nerves of Engliſhmen; and, after ſuch a ſuſpence of news, I am afraid the papers would contain nothing but accounts of the ſudden deaths which had happened in the interval, with the deliberate opinions of the coroner's jury, Died for want of intelligence!

CURIOUS CIRCUMSTANCES RESPECTING THE TWO ELEPHANTS BROUGHT TO PARIS FROM THE HAGUE.

THE place for their reception had been long prepared. It is a ſpacious hall in the Muſeum of Natural Hiſtory, well aired and lighted. A ſtove is placed in it to warm it during the winter, and it is divided into two apartments, which have a communication with each other by means of a large door reſembling a portcullis. The encloſure round theſe apartments conſiſts of rails made of ſtrong thick beams, and a ſecond encloſure, breaſt-high, runs round them, to keep the ſpectators at ſome diſtance, and preſerve them from accidents.

The morning after their arrival theſe two animals were put in poſſeſſion of their new habitation. The firſt conducted to it was the male, who iſſued from his cage with precaution, and ſeemed to enter his apartment with a degree of ſuſpicion. His firſt care was to reconnoitre the place. He examined each bar with his trunk, and tried their ſolidity by ſhaking them. Care had been taken to place on the outſide the large ſcrews by which they are held together. Theſe he ſought out, and, having found them, tried to turn them, but was not able. When he arrived at the portcullis, which ſeparates the two apartments, he obſerved that it was fixed only by an iron bar, which roſe in a perpendicular direction. He raiſed it with his trunk, puſhed up the door, and entered into the ſecond apartment, where he received his breakfaſt. He ate it quietly, and appeared to be perfectly eaſy.

During this time people were endeavouring to make the female enter. We ſtill recollect the mutual attachment of theſe two animals, and with what difficulty they were parted, and induced to travel ſeparately. From the time of their departure they had not ſeen each other; not even at Cambray, where they paſſed the winter. They had only been ſenſible that they were near neighbours. The male never lay down, but always ſtood upright or leaned againſt the bars of his cage, and kept watch for his female, who lay down and ſlept every night. On the leaſt noiſe, or the ſmalleſt alarm, he ſent forth a cry to give notice to his companion.

The

The joy which they experienced on ſeeing each other after ſo long a ſeparation may be readily imagined.

When the female entered, ſhe ſent forth a cry expreſſive only of the pleaſure which ſhe felt on finding herſelf at liberty. She did not at firſt obſerve the male, who was buſy feeding in the ſecond apartment. The latter alſo did not immediately diſcover that his companion was ſo near him; but the keeper having called him, he turned round, and immediately the two animals ruſhed towards each other, and ſent forth cries of joy ſo animated and loud, that they ſhook the whole hall. They breathed alſo through their trunks with ſuch violence, that the blaſt reſembled an impetuous guſt of wind. The joy of the female was the moſt lively: ſhe expreſſed it by quickly flapping her ears, which ſhe made to move with aſtoniſhing velocity. She drew her trunk over the body of the male with the utmoſt tenderneſs. She, in particular, applied it to his ear, where ſhe kept it a long time, and, after having drawn it over the whole body of the male, ſhe would often move it affectionately towards her own mouth. The male did the ſame thing over the body of the female, but his joy was more concentrated. He ſeemed to expreſs it by his tears, which fell from his eyes in abundance.

Since that moment they have never been ſeparated, and they occupy together the ſame apartment. The ſociety of theſe two animals, their habits, their mutual tenderneſs, and their natural attachment, ſtill excited by the privation of liberty, will furniſh curious obſervations for the hiſtory of their ſpecies. Theſe two elephants, which are natives of Ceylon, were brought to Holland when very young. Thay are about fifteen years of age. Their height is ſeven feet and ſome inches. Their tuſks, which are very ſhort, have been broken, but they will grow up again as they become older. The tail of the male hangs down to the ground; that of the female is much ſhorter.

MR. PARK's JOURNEY INTO THE INTERIOR PARTS OF AFRICA.

THE account of the proceedings of the African Aſſociation, from which the following extract is taken, though it abounds with many curious particulars which we have been obliged to omit, contains but a ſmall part of the information obtained by Mr. Park during the courſe of his peregrinations in the wild regions of Africa.

On the 2d of December, 1795, Mr. Park took his departure from the houſe of his friend Dr. Laidley, at Piſania, on the banks of the river Gambia, and directed his courſe eaſterly for the kingdom of Woolli. He was accompanied by two negro ſervants, natives of the country, one of whom ſpoke Engliſh tolerably well, and ſerved him as interpreter; the other was a boy preſented to him by Dr. Laidley. He had alſo a horſe for himſelf, and two aſſes for his ſervants. His baggage conſiſted chiefly of proviſions for two days, a ſmall aſſortment of beads, amber, and tobacco, for the purchaſe of a freſh ſupply as he proceeded; a few changes of linen and other neceſſary apparel, an umbrella, a pocket ſextant, a compaſs, and a thermometer, together with two fowling-pieces, two pair of piſtols, and ſome other ſmall articles.

Mr. Park reached Medina, the capital of Woolli, on third day, and was received by the sovereign or chief, name Jatta, with much kindness. The prince wished to persuade Mr. Park not to prosecute his journey any farther, by pointing out the dangers and difficulties he would have to encounter; but, finding his remonstrances had no effect, he furnished him with a guide to Bondou, and suffered him to depart.

Leaving Medina, Mr. Park proceeded onwards, and on the 21st of December reached Fatteconda, the capital of the kingdom of Bondou. The king of this country was a pagan, like that of Woolli; but he had adopted the Moorish name of Almami, and seems also to have imbibed somewhat of the Moorish disposition; for, though Mr. Park presented to him his umbrella and some other articles, he compelled him to strip in his presence and surrender his coat, which he said he should reserve for his own wearing on great and public festivals. In return, however, he gave our traveller five drachms (*minkallies*) of gold dust, and loaded him with provisions.

Departing from Fatteconda on the 23d of December, Mr. Park proceeded the two following days to a place called Joag in the kingdom of Kajaaga, a country bounded on the north by the Senegal river. The natives are called Sera-Woollies, and seem to be pure negroes. The appearance of a white man among them excited great curiosity. The king commanded that he should be brought before him; and it was with some difficulty that Mr. Park, who had been cautioned to avoid him, declined the interview, and got out of his dominions with the loss of about one half of his goods and apparel.

The name of this rapacious chief was Bacheri. He had recently fallen out with a neighbouring prince, the sovereign of Kasson, a country to the north east; and it happened that the King of Kasson's nephew was in Bacheri's capital, endeavouring, but in vain, to effect a reconciliation at the time of Mr. Park's arrival at Joag. This young man, finding that our traveller proposed proceeding to Kasson, kindly offered to take him under his protection. They accordingly set out together, and, after a journey of two days, crossed the river Senegal at Kayee, the frontier village of the King of Kasson's dominions, near which that river ceases to be navigable. From Kayee Mr. Park was led by his friendly conductor to Teesee, the place of his abode, and the residence of the king's brother Tigetee-Sego, an old man of a venerable aspect, but of a selfish disposition. He had never seen, he said, but one white man before, and, on describing him, it was known to be Major Houghton. The circumstance of having a white man under his roof was highly gratifying to the vanity of Tigetee-Sego, on account of the great number of the natives who resorted to see him. He therefore compelled our traveller to remain with him twelve days, and afterwards to take a journey of two days more to present himself to the king at his capital of Kooniakary, who detained him another fortnight, but in other respects behaved to him with great kindness and hospitality. Of this prince, whose name was Demba Sego Jalla, Mr. Park received the first certain account of Major Houghton's death.

Being permitted at length to leave the capital, Mr. Park prosecuted his journey eastward, and in five days arrived at Kemmoo, a large and populous town (since destroyed,) at that time the metropolis of Kaarta. The sovereign, whose name was Daysi Koorabarri, received Mr.

Mr. Park with great kindneſs. Major Houghton was the only European he had ever before ſeen, and he had conceived the higheſt idea of the ſuperiority of the whites to the blacks in all poſſible reſpects. The language of the country ſeemed to Mr. Park to be a mixture of the Mandingo and Sera-Woolli: but the pure Mandingo, in the attainment of which Mr. Park by this time had made conſiderable proficiency, was very generally underſtood, and with very little aſſiſtance from his interpreter he found no difficulty in conveying his own ſentiments, and comprehending others.

Having informed the king that he propoſed going to Bambara in ſearch of the Joliba river, which was believed to take its courſe through the centre of that extenſive kingdom, he was told that, the Bambarans being at that time in a ſtate of warfare with the Kaartans, he could not without extreme perſonal danger venture into the Bambaran country. His only ſafe route was a northerly courſe to Ludamar, a territory of the Moors in alliance with Manſong the King of Bambara; from whence, paſſing as a traveller from the Mooriſh country, he might venture, by a circuitous journey, to Bambara. To this advice being obliged to ſubmit, or give up all thoughts of proſecuting his journey in ſearch of the Niger, the king, as the laſt proof of his kindneſs, ſent eight horſemen to convey him in ſafety to Jarra, the frontier town of the Moors, where he arrived on the 18th of February, 1796. In the courſe of his journey he paſſed through a village not far from Jarra, called Simbing, from whence Major Houghton wrote his laſt diſpatch with a pencil.

The territories which our traveller had hitherto explored, being very generally clothed with native woods, preſented to the eye the appearance of great uniformity. In his progreſs eaſtward the country roſe into hills, and the ſoil varied to a conſiderable degree; but, wherever the land was cleared, great natural fertility was obſerved. Bondou in particular may literally be pronounced "a land flowing with milk and honey." But theſe articles, together with rice and Indian corn of two or three ſpecies, were to be obtained at a ſmall expence. Of their honey, the Pagan natives make an intoxicating liquor, much like the mead of Europe. The price of a fowl in Bondou was a button, or a ſmall bit of amber; goat's fleſh and mutton were proportionably cheap; and for ſix or eight amber beads Mr. Park might at any time have purchaſed a bullock. The domeſtic animals are nearly the ſame as in Europe: the Guinea fowl and red partridge abound in the fields; and the woods furniſh a ſmall ſpecies of antelope, of which the veniſon is highly and deſervedly prized.—Of the other wild animals in the Mandingo countries, the moſt common are, the hyæna, the panther, and the elephant. But the natives of Africa have not yet acquired the art of taming the laſt-mentioned animal, notwithſtanding his ſtrength and docility, ſo as to render him ſerviceable to man; and, when Mr. Park told ſome of them that this was actually done in the countries of the Eaſt, his auditors laughed, and exclaimed, *Tobaubo fonnio*,—"A white man's lie!"—The negroes frequently find means to deſtroy the wild elephant with fire-arms; they hunt it principally for the ſake of its teeth, which they transfer in barter to thoſe who ſell them again to the Europeans.

The

The paſtures of Bondou furniſh an excellent breed of horſes, but the uſual beaſt of burthen in all the negro territories is the aſs. The application of animal labour to the purpoſe of agriculture is wholly unknown. The chief implement uſed in huſbandry is the hoe, which varies in form in different diſtricts; and the labour is univerſally performed by ſlaves. Beſides the grains proper to tropical climates, the Mandingoes cultivate in conſiderable quantities ground-nuts, yams, and pompions. They likewiſe raiſe cotton and indigo, and have ſufficient ſkill to convert theſe materials into tolerably fine cloth of a rich blue colour; and they make good ſoap from a mixture of ground-nuts and a ley of wood-aſhes.

The town of Jarra, at which Mr. Park had now arrived, is ſituated in the kingdom of Ludamar, a Mooriſh country, of which it is not known that any account has ever been given in any of the languages of Europe. The town itſelf is extenſive, and the houſes are built of clay and ſtone intermixed; but the major part of the inhabitants are negroes from the borders of the Southern States, who prefer a precarious protection under the Moors, which they purchaſe by a tribute, to being continually expoſed to their predatory hoſtilities.

During his ſtay at Jarra, Mr. Park reſided at the houſe of a Slatee trader, named Daman, who was known to Dr. Laidley. By him Mr. Park was informed that he could proceed no farther on his way to Bambara, without leave from Ali, the Mooriſh chief or king of the country, who was then encamped at a place called Benowm; and that it was abſolutely neceſſary that a preſent ſhould accompany the application by which permiſſion was to be obtained. Mr. Park therefore purchaſed five garments of country cloth, by the ſale of one of his fowling-pieces. Daman undertook to nogotiate the buſineſs, and at the end of a fortnight permiſſion arrived from Benowm.

This permiſſion was brought by one of Ali's own ſlaves, who ſaid he was ordered to ſerve Mr. Park as a guide to Bambara; and on the 27th of February he took his departure from Jarra, accompanied by this ſlave, his own faithful boy, and a negro belonging to Daman; the interpreter refuſing to proceed any farther.

On the third day after his departure from Jarra they reached a large town called Deena; on entering which Mr. Park was ſurrounded by many of the Mooriſh inhabitants, who haraſſed him with ſhouts of inſult, ſpit in his face, and ſeized his baggage, which they robbed of what things they fancied. He got refuge, at length, in the houſe of a negro; and, after experiencing much difficulty in perſuading his attendants to proceed any farther, he ſet out on the ſecond day for Sampaka. Here he procured lodging at the houſe of a negro, who underſtood the art of making gunpowder. The nitre was obtained in conſiderable quantities from the ſwamps or ponds, which are filled in the rainy ſeaſon, and to which the cattle reſort in the heat of the day for coolneſs. As the water of theſe ponds is ſlowly exhaled by the ſun, the nitre appears in a white efloreſcence on the mud, and is carefully ſcraped off in the form of ſmall cryſtals. Sulphur is purchaſed of the Moors, and the ſeveral ingredients are blended together in ſuch proportions as experience hath ſhewn will anſwer the purpoſe; though the powder thus made is far inferior to that of Europe.

On the morning of the 7th of March, Mr. Park had reached a ſmall village called Sami, within two days journey of Goomba, the frontier

frontier town of Bambara; and was reſting himſelf in the hut of a friendly negro, pleaſed with the hopes of being ſoon out of danger, when he was alarmed by the arrival of two Moors, who announced that they came by order of Ali to convey him to the camp at Benowm. They added, that, if he conſented to go with them peaceably, he had nothing to fear; but that, if he refuſed, they had orders to carry him by force.

Finding entreaty and reſiſtance equally fruitleſs, for the meſſengers were joined by others, all of them armed, our traveller, guarded by the Moors and accompanied by the negro boy (Daman's negro having made his eſcape on ſeeing the Moors, and the ſlave ſent by Ali having previouſly left him on the road), ſet out on the evening of the ſame day for the camp at Benowm, which after a diſtreſſing journey they approached on the 12th. It preſented to the eye a multitude of dirty-looking tents, ſcattered without order over a large ſpace of ground; and among the tents were ſeen herds of camels, bullocks, and goats.

The arrival of a white man at the camp was no ſooner made known, than all the people who were drawing water at the wells threw down their buckets, thoſe in the tents mounted their horſes, and men, women, and children, came running or galloping towards him. He ſoon found himſelf ſurrounded with ſuch crowds that he could ſcarcely walk;—one pulled off his clothes—another took off his hat—a third ſtopped him to examine his waiſtcoat buttons—and a fourth called out *La illa ill Allahi, Mahomed raſowl Allahi,* "There is no god but God, and Mahomet is his prophet;" and ſignified in a threatening manner that he muſt repeat theſe words. He at length reached the tent of the king, whom he found ſitting upon a black leather cuſhion, clipping a few hairs from his upper lip, while a female attendant held up a looking-glaſs before him: there were many other females in the tent. The king appeared to be an old man of the Arab caſt, with a long white beard. He had a ſullen and indignant aſpect, and, looking at our traveller with attention, enquired of the Moors, if he could ſpeak Arabic; but, being anſwered in the negative, he appeared much ſurpriſed, and continued ſilent.

The ſurrounding attendants, and particularly the ladies, were far more curious and inquiſitive. They aſked a thouſand queſtions, inſpected every part of Mr. Park's apparel, ſearched his pockets, and obliged him to unbutton his waiſtcoat and diſplay the whiteneſs of his ſkin, &c. They even counted his toes and fingers, as if they doubted whether he was in truth a human being. When the curioſity of the ladies was in ſome meaſure ſatisfied, he was conducted to the tent of Ali's chief ſlave; into which however he was not permitted to enter, nor allowed to touch any thing belonging to it. He requeſted ſomething to eat, and ſome boiled corn with ſalt and water was at length ſent him in a wooden bowl; and a mat was ſpread out on the ſand before the tent, on which he paſſed the night, ſurrounded by the curious multitude. A hut was afterwards erected, in which he was confined and ſtrictly guarded.

Some time after a ludicrous circumſtance took place, which would not deſerve attention did it not tend to throw ſome light on the national manners of the people among whom our traveller reſided. Hearing one morning the ſound of drums, Mr. Park was informed that the noiſe was occaſioned by the celebration of a wedding in one

of the neighbouring tents. Soon after an old woman entered his hut with a bowl in her hand, and signified that she had brought him *a present from the bride.* Before he could recover from the surprise occasioned by this message, the woman discharged the contents of the bowl full in his face. Mr. Park finding that it was the same sort of *holy water* as that with which the priest among the Hottentots is said to besprinkle a new-married couple, he began to suspect that the old lady was actuated by mischief or malice; but she gave him seriously to understand that it was *a nuptial benediction from the bride's own person*, and which, on such occasions, is always received by the young unmarried Moors as a mark of distinguished favour.

The Moorish ladies seemed indeed to commiserate his condition, and one of them once privately sent him a small supply of meal and milk; but their kindness extended no farther. If they pitied his situation, it is probable that they dared not administer to his wants; and his distress at length became almost insurmountable. He was allowed a single meal of *kauscous*, a preparation of boiled corn, once in twenty-four hours. All his effects were taken from him, and he was not even indulged with a change of linen out of the few shirts he had brought in his portmanteau: oppressed at the same time with a burning fever, his situation was truly deplorable. "In this condition, from sun-rise to sun-set," says he, "was I obliged to suffer with an unruffled countenance the insults of the rudest savages on earth."

In eight or ten weeks, however, circumstances occurred, which, contrary to their first appearance, changed our traveller's situation for the better, and in the end produced his deliverance. In the war which prevailed between the kings of Bambara and Kaarta, the Moors at first took no active part; but, Ali having afterwards engaged to send 200 horse to the assistance of the fugitive Kaartans, he became panic-struck at the approach of the King of Bambara towards Benowm; broke up his camp, and fixed his tent in a country to the north. Mr. Park was compelled to follow him, and, after a month's confinement at the new camp, was led by Ali to Jarra. At this place he had the mortification to see the poor boy who had attended him from the Gambia taken from him, by Ali's command, for the avowed purpose of being sold into slavery. After this cruel circumstance, and the certain information which he received from Ali's own son (a youth of ten years of age, who had conceived something like friendship for Park, or pity for his misfortunes), that it was in contemplation to deprive Park himself of his life, or put out his eyes, he determined rather to risk perishing in the woods, of hunger, or by the fury of the wild beasts, than to remain any longer with a horde of faithless barbarians, whose tenderest mercies were cruelty, and from whose caprice or fanaticism he was in hourly danger of destruction.

On the morning of the 1st of July 1796, Mr. Park was so fortunate as to break the bonds of his captivity. He had contrived to procure at his departure his own horse, saddle and bridle; a few articles of apparel, and also his pocket compass. This last he had concealed in the sand during his confinement. He rode forwards the first of the whole day without stopping. "I felt," said he, "like one recovered from sickness; I breathed freer; I found unusual lightness in my limbs. Even the desert looked pleasant; and I dreaded nothing but falling

falling in with ſome wandering parties of Moors, who might convey me back to the land of thieves and murderers from which I had juſt eſcaped."

The firſt emotions of his mind ſubſiding however into ſober reflection, he ſoon found his condition to be very deplorable. His horſe grew tired, and he experienced the torments of thirſt raging beyond deſcription. Whenever he came to a tree, he climbed it in hopes of diſcovering a watering-place, but in vain; he chewed the leaves, but found they were all bitter, and afforded no relief. In a vaſt wilderneſs of the African continent, without an attendant or guide, without food and water, or the proſpect of procuring any; in a country where the lion and panther prowling for their prey are leſs to be apprehended than man; what ſituation could be more forlorn and dreadful? He proceeded onwards, however, directing his route nearly eaſt-ſouth-eaſt, in the view of reaching by the ſhorteſt courſe poſſible a diſtrict that might afford him ſhelter. A heavy rain about midnight enabled him to quench his burning thirſt, by ſpreading his clothes on the ground and ſucking the moiſture of them; and a muddy pool, which he found ſoon after, yielded relief to his horſe. The reſt of the night, and nearly the whole of the enſuing day, neither water nor food was to be found; and he muſt inevitably have periſhed, had he not fortunately towards evening lighted upon a few ſcattered huts of ſome Foulah ſhepherds. Perceiving an aged negro woman among thoſe who gazed at him with great earneſtneſs, he tendered her his pocket handkerchief, and requeſted in exchange a little corn to eat. She gave him a kind anſwer, invited him to her hut, and immediately produced a large wooden bowl of *kouſcous* ready prepared. She procured likewiſe ſome corn and water for the horſe. Thoſe only who have ſuffered ſimilar miſery can judge of his ſenſibility at this unexpected deliverance. But, as the village belonged to the Moors, our traveller had only a ſhort time to reſt. As he approached the territories of the negroes, however, his apprehenſions diminiſhed, and his condition improved.

It is worthy of remark, and highly to the credit of the female ſex, that Mr. Park ſeems invariably to have met with compaſſion and relief from women. This perfectly accords with the account given by another enterpriſing traveller, Mr. Ledyard, who expreſſes himſelf as follows: "I have always remarked that women in all countries are civil, obliging, tender, and humane; that they are ever inclined to be gay and cheerful, timorous and modeſt; and that they do not heſitate, like men, to perform a generous action. In wandering over the barren plains of inhoſpitable Denmark, through honeſt Sweden, and frozen Lapland, rude and churliſh Finland, unprincipled Ruſſia, and the wide-ſpread regions of the wandering Tartar, if hungry, dry, cold, wet or ſick, the women have ever been friendly to me, and uniformly ſo; and to add to this virtue, ſo worthy the appellation of benevolence, theſe actions have been performed in ſo free and ſo kind a manner, that if I was dry I drank the ſweeteſt draught, and if hungry I ate the coarſe morſel with a double reliſh."

Procuring precarious ſupport in this manner from the charity of the moſt wretched of human beings, Mr. Park wandered for the ſpace of fifteen days, ſtill however proceeding onwards in the accompliſhment of his miſſion. At length, in the morning of the ſixteenth day, having been joined by ſome Mandingo negroes, who were tra-

velling to Sego, he had the inexpreſſible ſatisfaction to behold the great object of his wiſhes—the long-ſought majeſtic Niger glittering to the morning ſun, as broad as the Thames at Weſtminſter, and flowing majeſtically but ſlowly from weſt to eaſt, through the middle of a very extenſive town, which his fellow-travellers told him was Sego, the capital of the great kingdom of Bambara. His emotions at this ſight were exquiſite, and it were unjuſt not to give them in our traveller's own words: "I haſtened," ſays he, "to the brink of the river; and, having drank of the water, lifted up my fervent thanks in prayer to the Great Ruler of all things, for having thus far crowned my endeavours with ſucceſs."—Unhappily, he had yet to ſuſtain many ſevere and bitter trials of his patience and fortitude.

Information of a conſiderable river flowing through the centre of Africa, between the latitudes of 15° and 20° north, had been received at very early periods from different quarters. At one time it was believed to be a part of the Senegal. The Gambia had the ſame honour aſcribed to it at another. But ſufficient proof was afterwards obtained that neither of theſe rivers was the Niger, and farther enquiries confirmed the ancient accounts of a ſtream that was not only of greater magnitude than either the Senegal or the Gambia, but which flowed in a contrary direction; running not to the weſtward into the Atlantic, but from weſt to eaſt, to regions unknown. The Moors deſcribed it by the name of *Nil il Abeed*, or the River of Slaves: the negroes beſtowed on it the appellation of *Joliba*, or the Great Waters.

Some doubt however ſtill remained. It was urged that the Moors might poſſibly ſpeak of one river, and the negroes of another; and the account of its direction towards the eaſt was received by our ableſt geographers with much difficulty and heſitation. On both theſe points Mr. Park's teſtimony is clear and deciſive; the Moors, in his hearing, uniformly called it Nil il Abeed; the inhabitants of Sego, the Joliba; and that it flowed from weſt to eaſt, he had ocular demonſtration in a long and perilous ambulation of ſome hundred miles, which he afterwards made on its banks. Thus therefore is all farther queſtion obviated concerning the exiſtence and direction of this great river; but its termination ſtill continues unknown.

PYROTECHNY; OR THE ART OF PREPARING ALL KINDS OF FIRE-WORKS.—Concluded from p. 206.

Aquatic Fire-works.

WORKS that ſport in the water are much eſteemed by moſt admirers of fire-works, particularly water-rockets; and, as they ſeem of a very extraordinary nature to thoſe who are unacquainted with this art, they merit a particular explanation.

Water-rockets, may be made from 4 oz. to 2lb. If larger, they are too heavy; ſo that it will be difficult to make them keep above water without a cork float, which muſt be tied to the neck of the caſe; but the rockets will not dive ſo well with as without floats. Caſes for theſe are made in the ſame manner and proportion as ſky-rockets, only a little thicker of paper. When you fill thoſe which are drove ſolid, put in firſt 1 ladleful of ſlow fire, then 2 of the proper charge, and on that one or two ladles of ſinking charge, then the proper charge, then

then the ſinking charge again, and ſo on, till you have filled the caſe within 3 diameters; then drive on the compoſition 1 ladleful of clay; through which make a ſmall hole to the charge; then fill the caſe, within ½ a diameter, with corn-powder, on which turn down 2 or 3 rounds of the caſe in the inſide; then pinch and tie the end very tight; having filled your rockets (according to the above directions), dip their ends in melted roſin or ſealing wax, or elſe ſecure them well with greaſe. When you fire theſe rockets, throw in 6 or 8 at a time; but, if you would have them all ſink, or ſwim, at the ſame time, you muſt drive them with an equal quantity of compoſition, and fire them all together.

To make Pipes of Communication, which may be uſed under Water.—Pipes for this purpoſe muſt be a little thicker of paper than thoſe for land. Having rolled a ſufficient number of pipes, and kept them till dry, waſh them over with drying oil, and ſet them to dry; but, when you oil them, leave about 1½ inch at each end dry, for joints: if they were oiled all over, when you come to join them, the paſte would not ſtick where the paper is greaſy: after the leaders are joined, and the paſte dry, oil the joints. Theſe pipes will lie many hours under water, without receiving any damage.

Horizontal Wheels for the Water.—Firſt get a large wooden bowl without a handle; then have an octagon wheel made of a flat board 18 inches diameter, ſo that the length of each ſide will be near ſeven inches: in all the ſides cut a groove for the caſes to lie in. This wheel being made, nail it on the top of the bowl; then take 4 eight-oz. caſes, filled with a proper charge, each about 6 inches in length. Now, to clothe the wheel with theſe caſes, get ſome whitiſh-brown paper, and cut it into ſlips 4 or 5 inches broad and 7 or 8 long: theſe ſlips being paſted all over on one ſide, take one of the caſes, and roll one of the ſlips of paper about 1½ inch on its end, ſo that there will remain about 2½ inches of the paper hollow from the end of the caſe: this caſe tie on one of the ſides of the wheel, near the corners of which muſt be holes bored, through which you put the packthread to tie the caſes: having tied on the firſt caſe at the neck and end, put a little meal-powder in the hollow paper; then paſte a ſlip of paper on the end of another caſe, the head of which put into the hollow paper on the firſt, allowing a ſufficient diſtance from the tail of one to the head of the other for the paſted paper to bend without tearing: the ſecond caſe tie on as you did the firſt: and ſo on with the reſt, except the laſt, which muſt be cloſed at the end, unleſs it is to communicate to any thing on the top of the wheel, ſuch as fire-pumps or brilliant fires, fixed in holes cut in the wheel, and fired by the laſt or ſecond caſe, as the fancy directs: 6, 8, or any number, may be placed on the top of the wheel, provided they be not too heavy for the bowl.

Before you tie on the caſes, cut the upper part of all their ends, except the laſt, a little ſhelving, that the fire from one may play over the other, without being obſtructed by the caſe. Wheel-caſes have no clay drove in their ends, nor pinched, but are always left open, only the laſt, or thoſe which are not to lead fire, which muſt be well ſecured.

Water Mines.—For theſe mines you muſt have a bowl with a wheel on it, made in the ſame manner as the water-wheel; only in its middle there muſt be hole, of the ſame diameter you deſign to have

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the mine. Thefe mines are tin pots, with ftrong bottoms, and a little more than two diameters in length: your mine muft be fixed in the hole in the wheel, with its bottom refting on the bowl; then loaded with ferpents, crackers, ftars, fmall water-rockets, &c. in the fame manner as pots of aigrettes; but in their centre fix a cafe of Chinefe fire, or a fmall gerbe, which muft be lighted at the beginning of the laft cafe on the wheel. Thefe wheels are to be clothed as ufual.

Fire-globes for the Water.—Bowls for water-globes muft be very large, and the wheels on them of a decagon form: on each fide of which nail a piece of wood 4 inches long; and on the outfide of each piece cut a groove, wide enough to receive about $\frac{1}{4}$ of the thicknefs of a 4-oz. cafe: thefe pieces of wood muft be nailed in the middle of each face of the wheel, and fixed in an oblique direction, fo that the fire from the cafes may incline upwards: the wheel being thus prepared, tie in each groove a 4-oz. cafe, filled with a grey charge; then carry a leader from the tail of one cafe to the mouth of the other.—Globes for thefe wheels are made of two tin hoops, with their edges outwards, fixed one within the other, at right angles. The diameter of thefe hoops muft be fomewhat lefs than that of the wheel. Having made a globe, drive in the centre of a wheel an iron fpindle, which muft ftand perpendicular, and its length 4 or 6 inches more than the diameter of the globe.

This fpindle ferves for an axis, on which the globe is fixed, which, when done, muft ftand 4 or 6 inches from the wheel: round one fide of each hoop muft be foldered little bits of tin, $2\frac{1}{2}$ inches diftance from each other; which pieces muft be two inches in length each, and only faftened at one end, the other ends being left loofe, to turn round the fmall port-fires, and hold them on: thefe port-fires muft be made of fuch a length as will laft out the cafes on the wheel. You are to obferve, that there need not be any port-fires at the bottom of the globe within four inches of the fpindle; for, if there were, they would have no effect, but only burn the wheel: all the port-fires muft be placed perpendicular from the centre of the globe, with their mouths outwards; and muft all be clothed with leaders, fo as all to take fire with the fecond cafe of the wheel; which cafes muft burn two at a time, one oppofite the other. When two cafes of a wheel begin together, two will end together; therefore the two oppofite end cafes muft have their ends pinched and fecured from fire. The method of firing fuch wheels is, by carrying a leader from the mouth of one of the firft cafes to that of the other; which leader being burnt through the middle, will give fire to both at the fame time.

Odoriferous Water Balloons.—Thefe balloons are made in the fame manner as air-balloons, but very thin of paper, and in diameter $1\frac{3}{4}$ inch, with a vent of $\frac{1}{2}$ inch diameter. The fhells being made, and quite dry, fill them with any of the following compofitions, which muft be rammed in tight: thefe balloons muft be fired at the vent, and put into a bowl of water. Odoriferous works are generally fired in rooms.

Compofition I. Saltpetre 2 oz. flour of fulphur 1 oz. camphor $\frac{1}{2}$ oz. yellow amber $\frac{1}{2}$ oz. charcoal-duft $\frac{3}{4}$ oz. flour of benjamin or affa odorata $\frac{1}{2}$ oz. all powdered very fine and well mixed.

II. Saltpetre 12 oz. meal-powder 3 oz. frankincenfe 1 oz. myrrh $\frac{1}{2}$ oz. camphor $\frac{1}{2}$ oz. charcoal 3 oz. all moiftened with the oil of fpike.

III. Saltpetre

III. Saltpetre 2 oz. ſulphur ½ oz. antimony ½ oz. amber ½ oz. cedar raſpings ¼ oz. all mixed with the oil of roſes and a few drops of bergamot.

IV. Saltpetre 4 oz. ſulphur 1 oz. ſaw-duſt of juniper ½ oz. ſaw-duſt of cypreſs 1 oz. camphor ¼ oz. myrrh 2 drams, dried roſemary ¼ oz. cortex elaterii ½ oz. all moiſtened a little with the oil of roſes. Water rockets may be made with any of the above compoſitions, with a little alteration, to make them weaker or ſtronger, according to the ſize of the caſes.

Water Balloons.—Having made ſome thin paper ſhells, of what diameter you pleaſe, fill ſome with the compoſition for water balloons, and ſome after this manner: Having made the vent of the ſhells pretty large, fill them almoſt full with water rockets, marrons, ſquibs, &c. Then put in ſome blowing powder, ſufficient to burſt the ſhells; and afterwards fix in the vent a water-rocket, long enough to reach the bottom of the ſhell, and its neck to project a little out of the vent; this rocket muſt be open at the end, to fire the powder in the ſhell, which will burſt the ſhell, and diſperſe the ſmall rockets, &c. in the water. When you have well ſecured the large rocket in the vent of the ſhell, take a cork float with a hole in its middle, which fit over the head of the rocket, and faſten it to the ſhell: this float muſt be large enough to keep the balloon above water.

Water Squibs are generally made of 1-oz. ſerpent caſes ſeven or eight inches long, filled two thirds with charge, and the remainder bounced. The common method of firing them is this: Take a water-wheel, with a tin mortar in its centre, which load with ſquibs after the uſual method; but the powder in the mortar muſt be no more than will juſt throw the ſquibs out eaſily into the water: you may place the caſes on the wheel either obliquely or horizontally; and on the top of the wheel, round the mortar, fix ſix caſes of brilliant fire perpendicular to the wheel: theſe caſes muſt be fired at the beginning of the laſt caſe of the wheel, and the mortar at the concluſion of the ſame.

A Sea fight with ſmall Ships, and to prepare a Fireſhip for it.—Having procured four or five ſmall ſhips, of two or three feet in length, (or as many as you deſign to fight), make a number of ſmall reports, which are to ſerve for guns. Of theſe range as many as you pleaſe on each ſide of the upper decks; then at the head and ſtern of each ſhip fix a two-ounce caſe, eight inches long, filled with a ſlow port-fire receipt; but take care to place it in ſuch a manner that the fire may fall in the water, and not burn the rigging: in theſe caſes bore holes at unequal diſtances from one another, but make as many in each caſe as half the number of reports, ſo that one caſe may fire the guns on one ſide, and the other thoſe on the oppoſite. The method of firing the guns is, by carrying a leader from the holes in the caſes to the reports on the decks; you muſt make theſe leaders very ſmall, and be careful in calculating the burning of the ſlow-fire in the regulating caſes, that more than two guns be not fired at a time. When you would have a broadſide given, let a leader be carried to a cracker, placed on the outſide of the ſhip; which cracker muſt be tied looſe, or the reports will be too ſlow: in all the ſhips put artificial guns at the port-holes.

Having filled and bored holes in two port-fires for regulating the guns in one ſhip, make all the reſt exactly the ſame; then, when you begin

begin the engagement, light one ſhip firſt, and ſet it a ſailing, and ſo on with the reſt, ſending them out ſingly, which will make them fire regularly, at different times, without confuſion; for the time between the firing of each gun will be equal to that of lighting the ſlow fires.

The fire-ſhip may be of any ſize; and need not be very good, for it is always loſt in the action. To prepare a ſhip for this purpoſe, make a port-fire equal in ſize with thoſe in the other ſhips, and place it at the ſtern; in every port place a large port-fire, filled with a very ſtrong compoſition, and painted in imitation of a gun, and let them all be fired at once by a leader from the ſlow fire, within two or three diameters of its bottom; all along both ſides, on the top of the upper deck, lay ſtar-compoſition about half an inch thick and one broad, which muſt be wetted with thin ſize, then primed with meal-powder, and ſecured from fire by paſting paper over it; in the place where you lay this compoſition, drive ſome little tacks with flat heads, to hold it faſt to the deck: this muſt be fired juſt after the ſham guns, and when burning will ſhew a flame all round the ſhip: at the head take up the decks, and put in a tin mortar loaded with crackers, which mortar muſt be fired by a pipe from the end of the ſlow fire; the firing of this mortar will ſink the ſhip, and make a pretty concluſion. The regulating port-fire of this ſhip muſt be lighted at the ſame time with the firſt fighting ſhip.

Having prepared all the ſhips for fighting, we ſhall next proceed with the management of them when on the water. At one end of the pond, juſt under the ſurface of the water, fix two running blocks, at what diſtance you chooſe the ſhips ſhould fight; and at the other end of the pond, oppoſite to each of theſe blocks, under the water, fix a double block; then on the land, by each of the double blocks, place two ſmall windlaſſes; round one of them turn one end of a ſmall cord, and the other end put through one of the blocks; then carry it through the ſingle one at the oppoſite end of the pond, and bring it back through the double block again, and round the other windlaſs: to this cord, near the double block, tie as many ſmall ſtrings as half the number of the ſhips, at what diſtance you think proper; but theſe ſtrings muſt not be more than two feet each: make faſt the looſe end of each to a ſhip, juſt under her bowſprit; but if tied to the keel, or too near the water, it will overſet the ſhip. Half the ſhips being thus prepared, near the other double block fix two more windlaſſes, to which faſten a cord, and to it tie the other half of the ſhips as before: when you fire the ſhips, pull in the cord with one of the windlaſſes, to get all ſhips together; and when you have ſet fire to the firſt, turn that windlaſs which draws them out, and ſo on with the reſt, till they are all out in the middle of the pond; then, by turning the other windlaſs, you will draw them back again; by which method you may make them change ſides, and tack about backwards and forwards at pleaſure. For the fire-ſhip, fix the blocks and windlaſſes between the others; ſo that when ſhe ſails out, ſhe will be between the other ſhips: you muſt not let this ſhip advance till the guns at her ports take fire.

To fire Sky-rockets under Water,—You muſt have ſtands made as uſual, only the rails muſt be placed flat inſtead of edgewiſe, and have holes in them for the rocket-ſticks to go through; for, if they were hung upon hooks, the motion of the water would throw them off:

off: the ſtands being made, if the pond is deep enough, ſink them at the ſides ſo deep, that, when the rockets are in, their heads may juſt appear above the ſurface of the water; to the mouth of each rocket fix a leader, which put through the hole with the ſtick; then a little above the water muſt be a board, ſupported by the ſtand, and placed along one ſide of the rockets; then the ends of the leaders are turned up through holes made in this board, exactly oppoſite the rockets. By this means you may fire them ſingly or all at once. Rockets may be fired by this method in the middle of a pond by a Neptune, a ſwan, a water-wheel, or any thing elſe you chooſe.

To repreſent Neptune in his Chariot.—To do this to perfection, you muſt have a Neptune (made of wood, or baſket-work) as big as life, fixed on a float large enough to bear his weight; on which muſt be two horſes heads and necks, ſo as to ſeem ſwimming. For the wheels of the chariot, there muſt be two vertical wheels of black fire, and on Neptune's head a horizontal wheel of brilliant fire, with all its caſes, to play upwards. When this wheel is made, cover it with paper or paſteboard, cut and painted like Neptune's coronet; then let the trident be made without prongs, but inſtead of them, fix three caſes of a weak grey charge, and on each horſe's head put an eight-ounce caſe of brilliant fire, and on the mouth of each fix a ſhort caſe, of the ſame diameter, filled with the white-flame receipt, enough to laſt out all the caſes on the wheels: theſe ſhort caſes muſt be opened at bottom, that they may light the brilliant fires; for the horſes eyes put ſmall port-fires, and in each noſtril put a ſmall caſe filled half with grey charge, and the reſt with port-fire compoſition.

If Neptune is to give fire to any building on the water; at his firſt ſetting out, the wheels of the chariot, and that on his head, with the white flames on the horſes heads, and the port-fires in their eyes and noſtrils, muſt all be lighted at once; then from the bottom of the white flames carry a leader to the trident. As Neptune is to advance by the help of a block and cord, you muſt manage it ſo as not to let him turn about till the brilliant fires on the horſes and the trident begin; for it is by the fire from the horſes (which plays almoſt upright) that the building, or work, is lighted; which muſt be thus prepared. From the mouth of the caſe which is to be firſt fired, hang ſome looſe quick-match to receive the fire from the horſes. When Neptune is only to be ſhewn by himſelf, without ſetting fire to any other works, let the white flames on the horſes be very ſhort, and not to laſt longer than one caſe of each wheel, and let two caſes of each wheel burn at a time.

Swans and Ducks in Water.—If you will have any ſwans or ducks diſcharge rockets into the water, they muſt be made hollow, and of paper, and filled with ſmall water rockets, with ſome blowing powder to throw them out: but, if this is not done, they may be made of wood, which will laſt many times. Having made and painted ſome ſwans, fix them on floats: then in the places where their eyes ſhould be, bore holes two inches deep, inclining downwards, and wide enough to receive a ſmall port-fire; the port-fire caſes for this purpoſe muſt be made of braſs, two inches long, and filled with a ſlow bright charge. In the middle of one of theſe caſes make a little hole; then put the port-fire in the eye-hole of the ſwan, leaving about half an inch to project out; and in the other eye put another port-fire, with a hole made in it: then in the neck of the ſwan, within two inches

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of one of the eyes, bore a hole ſlantwiſe, to meet that in the port-fire; in this hole put a leader, and carry it to a water-rocket, that muſt be fixed under the tail with its mouth upwards. On the top of the head place two 1-oz. caſes, four inches long each, drove with brilliant fire; one of theſe caſes muſt incline forwards, and the other backwards: theſe muſt be lighted at the ſame time as the water-rocket; to do which, bore a hole between them in the top of the ſwan's head, down to the hole in the port-fire, to which carry a leader: if the ſwan is filled with rockets, which muſt be fired by a pipe from the end of the water-rocket under the tail. When you ſet the ſwan a ſwimming, light the two eyes.

Water Fire-fountains.—To make a fire-fountain, you muſt firſt have a float made of wood, three feet diameter; then in the middle fix a round perpendicular poſt, four feet high, and two inches diameter; round this poſt fix three circular wheels made of thin wood, without any ſpokes. The largeſt of theſe wheels muſt be placed within two or three inches of the float, and muſt be nearly of the ſame diameter.

The ſecond wheel muſt be 2 feet 2 inches diameter, and fixed at 2 feet diſtance from the firſt. The third wheel muſt be 1 foot 4 inches diameter, and fixed within ſix inches of the top of the poſt: the wheels being fixed, take 18 four or eight oz. caſes of brilliant fire, and place them round the firſt wheel with their mouths outwards, and inclining downwards; on the ſecond wheel place 13 caſes of the ſame, and in the ſame manner as thoſe on the firſt; on the third, place 8 more of theſe caſes, in the ſame manner as before, and on the top of the poſt fix a gerbe; then clothe all the caſes with leaders, ſo that both they and the gerbe may take fire at the ſame time. Before you fire this work, try it in the water to ſee if the float is properly made, ſo as to keep the fountain upright.

ACCOUNT OF ALEXANDRIA IN EGYPT.

ALEXANDRIA, now Scanderia, is a city of Lower Egypt, and was for a long time its capital. This city was built by Alexander the Great, ſoon after the overthrow of Tyre, about 333 years before Chriſt. It is ſituated in the Mediterranean, twelve miles weſt of that mouth of the Nile anciently called *Canopicum*; and lies in E. lon. 30. 19. N. lat. 31. 10. Alexander is ſaid to have been induced to build this city, on account of its being conveniently ſituated for a fine port; and ſo ſudden was his reſolution, that after he had directed where every public ſtructure was to be placed, fixed the number of temples, and the deities to whom they ſhould be dedicated, &c. there were no inſtruments at hand proper for marking out the walls, according to the cuſtom of thoſe times. Upon this, a workman adviſed the king to collect what meal was among the ſoldiers, and to ſift it in lines upon the ground, whereby the circuit of the walls would be ſufficiently marked out. This advice was followed; and the new method of marking out the walls was, by Ariſtander, the king's ſoothſayer, interpreted as a preſage of the city's abounding with all the neceſſaries of life. Nor was he deceived in his prediction; for Alexandria ſoon became the ſtaple, not only for merchandiſe, but alſo for all the arts and ſciences of the Greeks.

Alexandria

Alexandria was a league and a half long by one-third in breadth, which made the circumference of its walls about four leagues. Lake Mareotis bathed its walls on the ſouth, and the Mediterranean on the north. It was interſected lengthwiſe by ſtraight parallel ſtreets. This direction left a free paſſage to the northerly wind, which alone conveys coolneſs and ſalubrity into Egypt. A ſtreet of 2000 feet wide began at the gate of the Sea, and terminated at the gate of Canopus. It was decorated by magnificent houſes, by temples, and by public buildings. In this extenſive range, the eye was never tired with admiring the marble, the porphyry, and the obeliſks, which were deſtined at ſome future day to embelliſh Rome and Conſtantinople. This ſtreet, the handſomeſt in the univerſe, was interſected by another of the ſame breadth, which formed a ſquare at their junction of half a league in circumference. From the middle of this great place, the two gates were to be ſeen at once, and veſſels arriving under full ſail from the north and from the ſouth.

A mole of a mile in length ſtretched from the continent to the iſle of Pharos, and divided the great harbour into two. That which is to the northward preſerved its name. A dyke, drawn from the iſland to the rock whereon was built the Pharos, ſecured it from the weſterly winds. The other was called *Eunoſtus*, or the Safe Return. The former is called at preſent the new, the latter the old, harbour: a bridge, that joins the mole to the city, ſerved for a communication between them. It was raiſed on lofty pillars ſunk into the ſea, and left a free paſſage for ſhips. The palace, which advanced beyond the promontory of *Lochias*, extended as far as the dyke, and occupied more than a quarter of the city. Each of the Ptolemies added to its magnificence. It contained within its incloſure, the muſeum, an aſylum for learned men, groves and buildings worthy of royal majeſty, and a temple where the body of Alexander was depoſited in a golden coffin. The infamous Seleucus Cibyoſactes violated this monument, carried off the golden coffin, and put a glaſs one in its place. In the great harbour was the little iſland of Anti-Rhodes, where ſtood a theatre, and a royal place of reſidence. Within the harbour of Eunoſtus was a ſmaller one, called *Kibotos*, dug by the hand of man, which communicated with Lake Mareotis by a canal. Between this canal and the palace was the admirable temple of Serapis, and that of Neptune near the great place where the market was held. Alexandria extended likewiſe along the ſouthern banks of the lake. Its eaſtern part preſented to view the gymnaſium, with its porticoes of more than 600 feet long, ſupported by ſeveral rows of marble pillars. Without the gate of Canopus was a ſpacious circus for the chariot races. Beyond that, the ſuburb of Nicopolis ran along the ſea ſhore, and ſeemed a ſecond Alexandria. A ſuperb amphitheatre was built there with a race-ground, for the celebration of the quinquennalia. Such is the deſcription left us of Alexandria by the ancients, and above all by Strabo.

The architect employed by Alexander in this undertaking was the celebrated Dinocrates, who had acquired ſo much reputation by rebuilding the temple of Diana at Epheſus. The city was firſt rendered populous by Ptolemy Soter, one of Alexander's captains, who, after the death of the Macedonian monarch, being appointed governor of Egypt, ſoon aſſumed the title of king, and took up his reſidence at Alexandria, about 304 years before Chriſt.

In the thirtieth year of Ptolemy Soter's reign, he took his son Ptolemy Philadelphus partner with him in the empire; and by this prince the city of Alexandria was much embellished. In the first year of his reign the famous watch-tower of Pharos was finished. It had been begun several years before by Ptolemy Soter; and, when finished, was looked upon as one of the wonders of the world. The same year, the island of Pharos itself, originally seven furlongs distant from the continent, was joined to it by a causeway. This was the work of Dexiphanes, who completed it at the same time that his son put the last hand to the tower. The tower was a large square structure of white marble: on the top of which fires were kept constantly burning, for the direction of sailors. The building cost 800 talents; which, if Attic, amounted to 165,000l. if Alexandrian, to twice that sum. The contrivance of the architect to usurp the glory of this great work to himself is well known.

This year also was remarkable for the bringing of the image of Serapis from Pontus to Alexandria. It was set up in one of the suburbs of the city called *Rhacotis*, where a temple was afterwards erected to his honour, suitable to the greatness of that stately metropolis, and called, from the god worshipped there, *Serapeum*. This structure, according to Ammianus Marcellinus, surpassed in beauty and magnificence all others in the world, except the capitol at Rome. Within the verge of this temple was the famous Alexandrian library. It was founded by Ptolemy Soter, for the use of an academy he instituted in this city; and by continual additions by his successors, became at last the finest library in the world, containing no fewer than 700,000 volumes. The method followed in collecting books for this library, was, to seize all those which were brought into Egypt by Greeks or other foreigners. The books were transcribed in the museum by persons appointed for that purpose; the copies were then delivered to the proprietors, and the originals laid up in the library. Ptolemy Euergetes, having borrowed from the Athenians the works of Sophocles, Euripides, and Æschylus, returned them only the copies, which he caused to be transcribed in as beautiful a manner as possible; presenting the Athenians at the same time with fifteen talents (upwards of 3000l. sterling) for the exchange. As the museum was at first in that quarter of the city called *Bruchion*, near the royal palace, the library was placed there likewise; but, when it came to contain 400,000 volumes, another library, within the Serapeum, was erected by way of supplement to it, and on that account called the *daughter* of the former. In this second library 300,000 volumes, in process of time were deposited; and the two together contained the 700,000 volumes already mentioned. In the war carried on by Julius Cæsar against the inhabitants of this city, the library in the Bruchion, with the 400,000 volumes it contained, was reduced to ashes. The library in the Serapeum, however, still remained; and here Cleopatra deposited 200,000 volumes of the Pergamean library, which Marc Antony presented her with. These, and others added from time to time, rendered the new library at Alexandria more numerous and considerable than the former; and, though it was often plundered during the revolutions and troubles of the Roman empire, and yet it was again and again repaired, and filled with the same number of books. For 293 years

Alexandria

Alexandria was held in ſubjection by the Ptolemies. Here follows a liſt of theſe princes, with the dates of their reſpective reigns.

Ptolemy the ſon of Lagus, ſurnamed Soter, reigned thirty-nine years, and died in the year of the world 3720. Ptolemy Philadelphus reigned thirty-nine years, and died in 3758. Ptolemy Euergetes reigned twenty-five years, and died in 3783. Ptolemy Philopator reigned ſeventeen years, and died in 3800. Ptolemy Epiphanes reigned twenty-four years, and died in 3824. Ptolemy Philometor reigned thirty-ſeven years, and died in 3861. Ptolemy Euergetes, or Phyſcon, reigned fifty-three years, part with his brother Philometor, and part alone. He died in 3888. Ptolemy Lathyrus reigned thirty-ſix years and ſix months. He died in 3923. Cleopatra, the daughter of Lathyrus and wife of Alexander I. reigned ſix months. Alexander I. the nephew of Lathyrus, was eſtabliſhed in 3924, and died in 3943. Alexander II. the ſon of Alexander I. was diſpoſſeſſed by the Alexandrians in 3949. Ptolemy Nothus, or Auletes, the ſon of Lathyrus, reigned thirteen years, and died in 3953. Ptolemy, ſurnamed *Dionyſius* or *Bacchus*, reigned three years eight months, and died in 3957. Cleopatra reigned from 3957, and killed herſelf in 3974.

The city, as we have already obſerved, ſoon became extremely populous, and was embelliſhed both by its own princes and the Romans; but, like moſt other noted cities of antiquity, hath been the ſeat of terrible maſſacres. About 141 years before Chriſt, it was almoſt totally depopulated by Ptolemy Phyſcon. That barbarous monſter, without the leaſt provocation, gave free liberty to his guards to plunder his metropolis and murder the inhabitants at their pleaſure. The cruelties practiſed on this occaſion cannot be expreſſed; and the few who eſcaped were ſo terrified that they fled into other countries. Upon this, Phyſcon, that he might not reign over empty houſes, invited thither ſtrangers from the neighbouring countries; by whom the city was re-peopled, and ſoon recovered its former ſplendour. On this occaſion many learned men having been obliged to fly, proved the means of reviving learning in Greece, Aſia Minor, the iſlands of the Archipelago, and other places, where it was almoſt totally loſt.

The new inhabitants were not treated with much more kindneſs by Phyſcon than the old ones has been; for, on their complaining of his tyrannical behaviour, he reſolved on a general maſſacre of the young men. Accordingly, when they were one day aſſembled in the gymnaſium, or place of their public exerciſes, he ordered it to be ſet on fire; ſo that they all periſhed, either in the flames, or by the ſwords of his mercenaries, whom the tyrant had placed at all the avenues.

Though Julius Cæſar was obliged to carry on a war for ſome time againſt this city, it ſeems not to have ſuffered much damage, except the burning of the library already mentioned. Before Cæſar left Alexandria, in acknowledgment of the aſſiſtance he had received from the Jews, he confirmed all their privileges there, and even engraved his decree on a pillar of braſs. This, however, did not prevent the maſſacre of 50,000 of them in this city about the year of Chriſt 67.

The city of Alexandria ſeems to have fallen into decay ſoon after this, and to have forfeited many of its ancient privileges, though for what offence is not known; but when Adrian viſited Egypt, about the year 141, it was almoſt totally ruined. He repaired both the public

public and private buildings, not only reſtoring the inhabitants to their ancient privileges, but heaping new favours upon them; for which they returned him their ſolemn thanks, and conferred upon him what honours they could while he was preſent; but, as ſoon as he was gone, they publiſhed the moſt bitter and virulent lampoons againſt him.

The fickle and ſatirical humour of the Alexandrians was highly diſliked by Adrian, though he inflicted no puniſhment upon them for it; but, when they lampooned Caracalla, he did not let them eſcape ſo eaſily. That tyrant, in the year 215, when he viſited their city, having become the ſubject of their fooliſh ſatires, ordered a general maſſacre by his numerous troops, who were diſperſed all over the city. The inhuman orders being given, all were murdered, without diſtinction of age or ſex; ſo that in one night's time the whole city floated in blood, and every houſe was filled with carcaſes. The monſter who occaſioned this had retired during the night to the temple of Serapis, to implore the protection of that deity; and, not yet ſatiated with ſlaughter, commanded the maſſacre to be continued all the next day; ſo that very few of the inhabitants remained. As if even this had not been ſufficient, he ſtripped the city of all its ancient privileges; ſuppreſſed the academy; ordered all ſtrangers who lived there to depart; and, that the few who remained might not have the ſatisfaction of ſeeing one another, he cut off all communication of one ſtreet with another, by walls built for that purpoſe, and guarded by troops left there.

Notwithſtanding this terrible diſaſter, Alexandria ſoon recovered its former ſplendour, as Caracalla was murdered a ſhort time after. It was long eſteemed the firſt city in the world, next to Rome; and we may judge of its magnificence, and the multitude of people contained in it, from the account of Diodorus Siculus, who relates, that in his time (forty-four years before Chriſt) Alexandria had on its rolls 300,000 freemen. Towards the middle of the ſixth century, Amrou *Ebn el Aas*, Omar's general, took it by ſtorm, after a ſiege of fourteen months, and with the loſs of 23,000 men. Heraclius, then Emperor of Conſtantinople, did not ſend a ſingle ſhip to its aſſiſtance. This prince affords an example very rare in hiſtory; he had diſplayed ſome vigour in the firſt year of his reign, and then ſuffered himſelf to be lulled into idleneſs and effeminacy. Awakened ſuddenly from his lethargy by the noiſe of the conqueſts of Coſroes, that ſcourge of the the eaſt, he put himſelf at the head of his armies, diſtinguiſhed himſelf as a great captain from his very firſt campaign, laid waſte Perſia for ſeven years, and returned to his capital covered with laurels: he then became a theologian on the throne, loſt all his energy, and amuſed himſelf the reſt of his life with diſputing upon monotheiſm, whilſt the Arabs were robbing him of the fineſt provinces of his empire. Deaf to the cries of the unfortunate inhabitants of Alexandria, as he had been to thoſe of the people of Jeruſalem, who defended themſelves for two years, he left them a ſacrifice to the fortunate aſcendant of the indefatigable Amrou. All their intrepid youth periſhed with their arms in their hands. The victor, aſtoniſhed at his conqueſt, wrote to the caliph, "I have taken the city of the weſt. It is of an immenſe extent. I cannot deſcribe to you how many wonders it contains. There are 4000 palaces, 4000 baths, 12,000 dealers in freſh oil, 12,000 gardeners, 40,000 Jews who pay tribute, 400 comedians,"

medians," &c. At this time according to the Arabian hiſtorians, Alexandria conſiſted of three cities, viz. Menna, or the port, which included Pharos, and the neighbouring parts; Alexandria, properly ſo called, where the modern Scanderia now ſtands; and Nekita, probably the Necropolis of Joſephus and Strabo.

At that time John, ſurnamed the grammarian, a famous Peripatetic philoſopher, being in the city, and in high favour with Amrou Ebn al Aas the Saracen general, begged of him the royal library. Amrou replied, that it was not in his power to grant ſuch a requeſt; but that he would write to the khalif on that head; ſince, without knowing his pleaſure, he dared not to diſpoſe of a ſingle book. He accordingly wrote to Omar, who was then khalif, acquainting him with the requeſt of his friend: to which the Mahometan prince replied, That, if theſe books contained the ſame doctrine with the koran, they could be of no uſe, ſince the koran contained all neceſſary truths; but, if they contained any thing contrary to that book, they ought not to be ſuffered; and therefore, whatever their contents were, he ordered them to be deſtroyed. Purſuant to this ridiculous order, they were diſtributed among the public baths; where, for the ſpace of ſix months, they ſerved to ſupply the fires of thoſe places, of which there was an incredible number in Alexandria.

After the city was taken, Amrou thought proper to purſue the Greeks who had fled farther up the country; and therefore marched out of Alexandria, leaving but a very ſlender garriſon in the place. The Greeks, who had before fled on-board their ſhips, being appriſed of this, returned on a ſudden, ſurpriſed the town, and put all the Arabs they found therein to the ſword: but Amrou, receiving advice of what had happened, ſuddenly returned, and drove them out of it with great ſlaughter; after which the Greeks were ſo intimidated, that he had nothing farther to fear from them.—A few years after, however, Amrou being deprived of his government by the khalif Othman, the Egyptians were ſo much diſpleaſed with his diſmiſſion, that they inclined to a revolt; and Conſtantine the Greek emperor, having received intelligence of their diſaffection, began to meditate the reduction of Alexandria. For this purpoſe, he ſent one Manuel, an eunuch, and his general, with a powerful army, to retake the place; which, by the aſſiſtance of the Greeks in the city, who kept a ſecret correſpondence with the imperial forces while at ſea, and joined them as ſoon as they had made a deſcent, he effected without any conſiderable effuſion of blood. The khalif, now perceiving his miſtake, immediately reſtored Amrou to his former dignity. This ſtep was very agreeable to the natives; who having had experience of the military ſkill and bravery of this renowned general, and apprehending that they ſhould be called to an account by the Greeks for their former perfidious conduct, had petitioned Othman to ſend him again into Egypt.—Upon Amrou's arrival, therefore, at Alexandria, the Copts or natives, with the traitor Al-Mokawkas (who had formerly betrayed to Amrou the fortreſs of Meſr) at their head, not only joined him, but ſupplied him with all kinds of proviſions, exciting him to attack the Greeks without delay. This he did; and, after a moſt obſtinate diſpute which laſted ſeveral days, drove them into the town, where, for ſome time, they defended themſelves with great bravery, and repelled the utmoſt efforts of the beſiegers. This ſo exaſperated Amrou, that he ſwore, "If God enabled him to con-

quer

quer the Greeks, he would throw down the walls of the city, and make it as eaſy of acceſs as a *bawdy-houſe*, which lies open to every body." Nor did he fail to execute this menace; for, having taken the town by ſtorm, he quite diſmantled it, entirely demoliſhing the walls and fortifications. The lives of the citizens, however, were ſpared, at leaſt as far as lay in the general's power; but many of them were put to the ſword by the ſoldiers on their firſt entrance. In one quarter particularly, Amrou found them butchering the Alexandrians with unrelenting barbarity; to which, by his ſeaſonable interpoſition, he put a ſtop, and on that ſpot erected a moſque, which he called the *moſque of mercy*.

From this time Alexandria never recovered its former ſplendour. It continued under the dominion of the khalifs till the year 924, when it was taken by the Magrebians, two years after its great church had been deſtroyed by fire. This church was called by the Arabs, *Al Kaiſaria, or Cæſarea*; and had formerly been a pagan temple, erected in honour of Saturn by the famous queen Cleopatra.

The city was ſoon after abandoned by the Magrebians; but in 928 they again made themſelves maſters of it; their fleet being afterwards defeated by that belonging to the khalif. *Abul Kaſem* the Magrebian general retired from Alexandria, leaving there only a garriſon of 300 men, of which *Thmaál*, the khalif's admiral, being appriſed, he in a few days appeared before the town, and carried off the remainder of the inhabitants to an iſland in the Nile called *Abukair*. This was done to prevent Abul Kaſem from meeting with any entertainment at Alexandria, in caſe he ſhould think proper to return. According to Eutychius, about 200,000 of the miſerable inhabitants periſhed this year.

What contributed to raiſe Alexandria to ſuch a prodigious height of ſplendour as it enjoyed for a long time, was its being the centre of commerce between the eaſtern and weſtern parts of the world. It was with the view of becoming maſter of this lucrative trade, that Alexander built this city, after having extirpated the Tyrians who formerly engroſſed all the Eaſt-India traffic. Of the immenſe riches which that trade afforded, we may form an idea, from conſidering that the Romans accounted it a point of policy to oppreſs the Egyptians, eſpecially the Alexandrians; and, after the defeat of Zenobia, there was a ſingle merchant of Alexandria who undertook to raiſe and pay an army out of the profits of his trade. The Greek emperors drew prodigious tributes from Egypt, and yet the khalifs found their ſubjects in ſo good circumſtances as to ſcrew up their revenues to three hundred millions of crowns.

Though the revolutions which happened in the government of Egypt, after it fell into the hands of the Mahometans, frequently affected this city to a very great degree; yet ſtill the excellence of its port, and the innumerable conveniencies reſulting from the Eaſt-India trade, to whomſoever were maſters of Egypt, preſerved Alexandria from total deſtruction, even when in the hands of the moſt barbarous nations. Thus, in the thirteenth century, when the barbariſm introduced by the Goths, &c. began to wear off from the European nations, and they acquired a taſte for the elegancies of life, the old mart of Alexandria began to revive; and the port, though far from recovering its former magnificence, grew once more famous by becoming the centre of commerce: but having fallen under the dominion

dominion of the Turks, and the paſſage round the Cape of Good Hope being diſcovered by the Portugueſe in 1499, a fatal blow was given to the Alexandrian commerce, and the city has ſince fallen into decay.

At preſent, the city of Alexandria is reckoned to have about 15,000 inhabitants; a ſtrange colluvies of different nations, as well as from various parts of the Turkiſh empire. They are in general given to thieving and cheating; and (like their predeceſſors) ſeditious above all others, were they not kept in awe by the ſeverity of their government. The Britiſh and French carry on a conſiderable commerce with them, and have each a conſul reſiding here. Some Venetian ſhips alſo ſail thither yearly, but moſtly under French colours. The ſubjects of thoſe kingdoms which keep no conſul here are ſubjected to a tax by the Grand Signior: but the Jews have found out a method of indemnifying themſelves for this diſadvantage; namely, by ſelling their commodities cheaper than other foreigners can afford. They are alſo favoured by the farmers of the revenue; who know, that, if they do not pay ſome private regard to them, the Jews have it in their power to cauſe fewer merchandizes to come into their port during the two years that their farm laſts.

The preſent city is a kind of peninſula ſituated between the two ports. That to the weſtward was called by the ancients the *Portus Eunoſtus*, now the *Old Port*, and is by far the beſt; Turkiſh veſſels only are allowed to anchor there: the other, called the *New Port*, is for the Chriſtians; at the extremity of one of the arms of which ſtood the famous Pharos. The New Port, the only harbour for the Europeans, is clogged up with ſand, inſomuch that in ſtormy weather ſhips are liable to bilge; and, the bottom being alſo rocky, the cables ſoon chafe and part; ſo that one veſſel driving againſt a ſecond, and that againſt a third, they are perhaps all loſt. Of this there was a fatal inſtance about twenty-five years ago, when forty-two veſſels were daſhed to pieces on the mole in a gale of wind from the north-weſt, and numbers have been ſince loſt there at different times. If it be aſked in Europe, Why do they not repair the New Port? the anſwer is, That in Turkey they deſtroy every thing, and repair nothing. The old harbour will be deſtroyed likewiſe, as the ballaſt of veſſels has been continually thrown into it for the laſt 200 years. The ſpirit of the Turkiſh government is to ruin the labours of paſt ages, and deſtroy the hopes of future times, becauſe the barbarity of ignorant deſpotiſm never conſiders to-morrow.

In time of war, Alexandria is of no importance; no fortification is to be ſeen; even the Farillon, with its lofty towers, cannot be defended. It has not four cannon fit for ſervice, nor a gunner who knows how to point them. The 500 janiſaries, who ſhould form the garriſon, reduced to half that number, know nothing but how to ſmoke a pipe. This made Buonaparte's landing and paſſage through it in Auguſt of the preſent year (1798) ſuch an eaſy matter. But Alexandria is a place of which the conqueſt would be of no value. A foreign power could not maintain itſelf there, as the country is without water. This muſt be brought from the Nile by the kalidj, or canal of twelve leagues, which conveys it thither every year at the time of the inundation. It fills the vaults or reſervoirs dug under the ancient city, and this proviſion muſt ſerve till the next year. It is this canal alone which connects Alexandria with

Egypt;

Egypt; for from its ſituation without the Delta, and the nature of the ſoil, it really belongs to the deſerts of Africa. Its environs are ſandy, flat, and ſterile, without trees and without houſes; where we meet with nothing but the plant which yields the kali, and a row of palm-trees which follows the courſe of the kalidj or canal.

The city is governed like others in the ſame kingdom. It hath a ſmall garriſon of ſoldiers, part of which are janiſaries and aſſaffs; who are very haughty and inſolent, not only to ſtrangers, but to the mercantile and induſtrious part of the people, though ever ſo conſiderable and uſeful. The government is ſo remiſs in favour of theſe wretches, that Mr. Norden informs us, one of them did not heſitate to kill a farmer of the cuſtoms, for refuſing to take leſs of him than the duty impoſed, and went off unpuniſhed; it being a common ſalvo among them, that what is done cannot be undone.

The preſent condition of Alexandria is very deſpicable, being now ſo far ruined, that the rubbiſh in many places overtops the houſes. The famous tower of Pharos has long ſince been demoliſhed, and a caſtle, called Farillon, built in its place. The cauſeway which joined the iſland to the continent is broken down, and its place ſupplied by a ſtone bridge of ſeveral arches. Some parts of the old walls of the city are yet ſtanding, and preſent us with a maſterpiece of ancient maſonry. They are flanked with large towers, about two hundred paces diſtant from each other, with ſmall ones in the middle. Below are magnificent caſemates, which may ſerve for galleries to walk in. In the lower part of the towers is a large ſquare hall, whoſe roof is ſupported by thick columns of Thebaic ſtone. Above this are ſeveral rooms, over which there are platforms more than twenty paces ſquare. The ancient reſervoirs, vaulted with ſo much art, which extend under the whole town, are almoſt entire at the end of two thouſand years.

Of Cæſar's palace there remain a few porphyry pillars, and the front, which is almoſt entire, and looks very beautiful. The palace of Cleopatra was built upon the walls facing the port, having a gallery on the outſide, ſupported by ſeveral fine columns. Not far from this palace are two obeliſks called *Cleopatra's Needles*. They are of Thebaic ſtone, and covered with hieroglyphics. One is overturned, broken, and lying under the ſand; the other is on its pedeſtal. Theſe two obeliſks, each of them of a ſingle ſtone, are about ſixty feet high, by ſeven feet ſquare at the baſe. Towards the gate of Roſetta, are five columns of marble on the place formerly occupied by the porticoes of the gymnaſium. The reſt of the colonnade, the deſign of which was diſcoverable 100 years ago by Maillet, has ſince been deſtroyed by the barbariſm of the Turks.

But what moſt engages the attention of travellers is the pillar of Pompey, as it is commonly called, ſituated at a quarter of a league from the ſouthern gate. It is compoſed of red granite. The capital is Corinthian, with palm-leaves, and not indented. It is nine feet high. The ſhaft and the upper member of the baſe are of one piece of ninety feet long, and nine in diameter. The baſe is a ſquare of about fifteen feet on each ſide. This block of marble, ſixty feet in circumference, reſts on two layers of ſtone bound together with lead; which, however, has not prevented the Arabs from forcing out ſeveral of them, to ſearch for an imaginary treaſure. The whole column is 114 feet high. It is perfectly well poliſhed, and only a little

ſhivered

ſhivered on the eaſtern ſide. Nothing can equal the majeſty of this monument; ſeen from a diſtance, it overtops the town, and ſerves as a ſignal for veſſels. Approaching it nearer, it produces an aſtoniſhment mixed with awe. One can never be tired with admiring the beauty of the capital, the length of the ſhaft, nor the extraordinary ſimplicity of the pedeſtal. This laſt has been ſomewhat damaged by the inſtruments of travellers, who are curious to poſſeſs a relic of this antiquity; and one of the volutes of the column was immaturely brought down about twelve years ago, by a prank of ſome Engliſh captains, which is thus related by Mr. Irwin.

Theſe jolly ſons of Neptune had been puſhing about the can on-board one of the ſhips in the harbour, until a ſtrange freak entered into one of their brains. The eccentricity of the thought occaſioned it immediately to be adopted; and its apparent impoſſibility was but a ſpur for the putting of it into execution. The boat was ordered; and with proper implements for the attempt theſe enterpriſing heroes puſhed aſhore, to drink a bowl of punch on the top of Pompey's pillar! At the ſpot they arrived; and many contrivances were propoſed to accompliſh the deſired point. But their labour was vain; and they began to deſpair of ſucceſs, when the genius who ſtruck out the frolic happily ſuggeſted the means of performing it. A man was diſpatched to the city for a paper kite. The inhabitants were by this time apprized of what was going forward, and flocked in crowds to be witneſſes of the addreſs and boldneſs of the Engliſh. The governor of Alexandria was told that theſe ſeamen were about to pull down Pompey's pillar. But whether he gave them credit for their reſpect to the Roman warrior, or to the Turkiſh government, he left them to themſelves; and politely anſwered, that the Engliſh were too great patriots to injure the remains of Pompey. He knew little, however, of the diſpoſition of the people who were engaged in this undertaking. Had the Turkiſh empire roſe in oppoſition, it would hardly have deterred them. The kite was brought, and flown ſo directly over the pillar, that, when it fell on the other ſide, the ſtring lodged upon the capital. The chief obſtacle was now overcome. A two-inch rope was tied to one end of the ſtring, and drawn over the pillar by the end to which the kite was affixed. By this rope one of the ſeamen aſcended to the top; and in leſs than an hour, a kind of ſhroud was conſtructed, by which the whole company went up, and drank their punch amid the ſhouts of the aſtoniſhed multitude. To the eye below, the capital of the pillar does not appear capable of holding more than one man upon it; but our ſeamen found it could contain no leſs than eight perſons very conveniently. It is aſtoniſhing that no accident befel theſe madcaps, in a ſituation ſo elevated, that would have turned a landman giddy in his ſober ſenſes. The only detriment which the pillar received, was the loſs of the volute before mentioned; which came down with a thundering ſound, and was carried to England by one of the captains, as a preſent to a lady who commiſſioned him for a piece of the pillar. The diſcovery which they made amply compenſated for this miſchief; as, without their evidence, the world would not have known at this hour, that there was originally a ſtatue on this pillar, one foot and ancle of which are ſtill remaining. The ſtatue muſt have been of a gigantic ſize, to have appeared of a man's proportion at ſo great an height.

 There

There are circumſtances in this ſtory which might give it an air of fiction, were it not demonſtrated beyond all doubt. Beſides the teſtimonies of many eye-witneſſes, the adventurers themſelves have left us a tóken of the fact, by the initials of their names, which are very legible in black paint juſt beneath the capital.

Learned men and travellers have made many fruitleſs attempts to diſcover in honour of what prince it was erected. The beſt informed have concluded, that it could not be in honour of Pompey, ſince neither Strabo nor Diodorus Siculus have ſpoken of it. The Arabian Abulfeda, in his deſcription of Egypt, calls it *the pillar of Severus*. And hiſtory informs us, that this emperor " viſited the city of Alexandria: That he granted a ſenate to its inhabitants, who until that time, under the ſubjection of a ſingle Roman magiſtrate, had lived without any national council, as under the reign of the Ptolemies, when the will of the prince was their only law: That he did not confine his benefactions there; he changed ſeveral laws in their favour." This column, therefore, Mr. Savary concludes to have been erected by the inhabitants as a mark of their gratitude to Severus. And in a Greek inſcription, now half effaced, but viſible on the weſt ſide when the ſun ſhines upon it, and which probably was legible in the time of Abulfeda, he ſuppoſes the name of Severus to have been preſerved. He farther obſerves, that this was not the only monument erected to him by the gratitude of the Alexandrians: for there is ſtill ſeen in the ruins of Antinoe, built by Adrian, a magnificent pillar, the inſcription on which is ſtill remaining, dedicated to Alexander Severus.

On the ſouth-weſt ſide of the city, at a mile diſtant, are ſituated the catacombs, the ancient burial place of Alexandria: and although they cannot be compared to thoſe of the ancient Memphis, which the Arabs will not permit to be viſited, in order to make the better market of their mummies, it is probable that, the method of embalming being the ſame, the form of theſe catacombs can only differ in their proportions.—The Baron de Tott, in deſcribing theſe, obſerves, " that Nature not having furniſhed this part of Egypt with a ridge of rocks, like that which runs parallel with the Nile above Delta, the ancient inhabitants of Alexandria could only have an imitation by digging into a bed of ſolid rock; and thus they formed Necropolis, or 'City of the Dead.' The excavation is from thirty to forty feet wide, 200 long, and twenty-five deep, and is terminated by gentle declivities at each end. The two ſides, cut perpendicularly, contain ſeveral openings, about ten or twelve feet in width and height, hollowed horizontally; and which form, by their different branches, ſubterranean ſtreets. One of theſe, which curioſity has diſencumbered from the ruins and ſands that render the entrance of others difficult or impoſſible, contains no mummies, but only the places they occupied. The order in which they were ranged is ſtill to be ſeen. Niches, twenty inches ſquare, ſunk ſix feet horizontally, narrowed at the bottom, and ſeparated from each other by partitions in the rocks, ſeven or eight inches thick, divide into checkers the two walls of this ſubterranean vault. It is natural to ſuppoſe, from this diſpoſition, that each mummy was introduced with the feet foremoſt into the cell intended for its reception; and that new ſtreets were opened, in proportion as theſe dead inhabitants of Necropolis increaſed." This obſervation, he adds, which throws a light on the

the catacombs of Memphis, may perhaps likewife explain the vaft fize and multitude, as well as the different elevations, of the pyramids in the Higher and Lower Egypt.

About feventy paces from Pompey's pillar is the khalis, or the the canal of the Nile, which was dug by the ancient Egyptians, to convey the water of the Nile to Alexandria, and fill the cifterns under the city. On the fide of the khalis are gardens full of orange and lemon trees, and the fields are full of caper and palm-trees. On the top of a hill is a tower, on which a centinel is always placed, to give notice, by means of a flag, of the fhips that are coming into the port. From this hill may be feen the fea, the whole extent of the city, and the parts round it.

In going along the fea-coaft, there is a large bafon cut out of the rock that lines the fhore. On the fides of this bafon, two beautiful faloons are hewn out by the chifel, with benches that run acrofs them. A canal made zig-zag, for the purpofe of ftopping the fand by its different windings, conveys into them the water of the fea, as pure and tranfparent as cryftal. Seated on the ftone bench, the water rifes a little above the waift; while the feet foftly repofe on a fine fand. The waves of the fea are heard roaring againft the rock, and foaming in the canal. The fwell enters, raifes you up, and leaves you; and thus, alternately entering and retiring, brings a continual frefh fupply of water, and a coolnefs which is truly delicious under a burning fky. This place is vulgarly called the Bath of Cleopatra. Some ruins announce that it was formerly ornamented. Alexandria is about fifty leagues north of Cairo. Lat. 31. 12. N. lon. 31. 15. E.

AUGUST 22, 1798. Though the divan had been informed of the French intending to invade Egypt, yet by many of its members this report was deemed a mere fiction, invented to difturb the good underftanding which fubfifted between the Ottoman Porte and France. Their aftonifhment was therefore extreme, when they were officially acquainted with the French having actually effected a defcent near Alexandria. The particulars of this unexpected event are as follow:

The Toulon fleet, after having for fome time cruized in the Archipelago, appeared before Alexandria, and the French demanded to be received as friends. The Muffulman, who commanded in that city, made very ftrong remonftrances againft their projected landing, endeavouring to convince them that any attempt of that kind would be confidered as an attack on the right of fovereignty of the Grand Signior, on the privileges of the country, and on the tranquillity and fafety of the inhabitants. But all his remonftrances proved fruitlefs; the French landed in different places about 22,000 men, notwithftanding the refiftance made by the Egyptian troops, and the inhabitants of the country. Two days after, the French intending to occupy a poft to the right of Alexandria towards Rofetta, they were furprifed by a corps of about 6,000 Egyptian horfe, and fome thoufand foot, commanded by a bey who enjoyed the reputation of a brave and gallant foldier. The engagement lafted a few hours, and the bey was forced to retreat with confiderable lofs, though the French fuffered likewife confiderably; and their lofs was more feverely felt, as they were unable to repair it. This action convinced Buonaparte of the fentiments of refpect entertained for him by the Arabs, and by the Egyptian troops. He called a council of war, the

refult of which was, to advance beyond Rofetta, and to entrench himfelf about ten or twelve leagues from that town on the banks of the canal which leads to Cairo. In this pofition, he iffued a proclamation, and endeavoured to fet on foot a negociation with the beys, who, however, peremptorily refufed to treat with him, but infifted on his re-embarking his troops and quitting the dominions of the Grand Signior.

In this fituation were the affairs of Egypt on the departure of the laft accounts received from that county.

Within thefe few days a proclamation has been made public, which Buonaparte is faid to have iffued in the Arabic language, on his landing in Egypt. The following is a tranflation of it:

" In the name of God, gracious and merciful. There is no God but God; he has no fon nor affociate in his kingdom.

" The prefent moment, which is deftined for the punifhment of the beys, has been long anxioufly expected. The beys, coming from the mountains of Georgia and Bajars, have defolated this beautiful country, long infulted and treated with contempt the French nation, and oppreffed her merchants in various ways. Buonaparte, the general of the French republic, according to the principles of liberty, is now arrived, and the Almighty, the Lord of both worlds, has fealed the deftruction of the beys.

" Inhabitants of Egypt, when the beys tell you the French are come to deftroy your religion, believe them not: it is an abfolute falfehood. Anfwer thofe deceivers, that they are only come to refcue the rights of the poor from the hands of their tyrants, and that the French adore the Supreme Being, and honour the Prophet and his Holy Koran.

" All men are equal in the eyes of God. Underftanding, ingenuity, and fcience, alone, make a difference between them: as the beys, therefore, do not poffefs any of thefe qualities, they cannot be worthy to govern the country.

" Yet are they the only poffeffors of extenfive tracts of land, beautiful female flaves, excellent horfes, magnificent palaces! Have they then received an exclufive privilege from the Almighty? If fo, let them produce it. But the Supreme Being, who is juft and merciful towards all mankind, wills that, in future, none of the inhabitants of Egypt fhall be prevented from attaining to the firft employments, and the higheft honours. The adminiftration, which fhall be conducted by perfons of intelligence, talents, and forefight, will be productive of happinefs and fecurity. The tyranny and avarice of the beys have laid wafte Egypt, which was formerly fo populous and well cultivated.

" The French are true Muffulmen. Not long fince they marched to Rome, and overthrew the throne of the pope, who excited the Chriftians againft the profeffors of Iflam (the Mahometan religion); afterwards they directed their courfe to Malta, and drove out the unbelievers, who imagined they were appointed by God to make war on the Muffulmen. The French have at all times been the true and fincere friends of the Ottoman emperors, and the enemies of their enemies. May the empire of the fultan, therefore, be eternal, but may the beys of Egypt, our oppofers, whofe infatiable avarice has continually excited difobedience and infubordination, be trodden in the duft and annihilated.

" Our

"Our friendſhip ſhall be extended to thoſe of the inhabitants of Egypt who ſhall join us; as alſo to thoſe who ſhall remain in their dwellings, and obſerve a ſtrict neutrality, and, when they have ſeen our conduct with their own eyes, haſten to ſubmit to us; but the dreadful puniſhment of death awaits thoſe who ſhall take up arms for the beys and againſt us. For them there ſhall be no deliverance, nor ſhall any trace of them remain.

"Art. I. All places which ſhall be three leagues diſtant from the route of the French army, ſhall ſend one of their principal inhabitants to the general to declare that they ſubmit, and will hoiſt the French flag, which is blue, white, and red.

II. Every village which ſhall oppoſe the French army ſhall be burned to the ground.

III. Every village which ſhall ſubmit to the French ſhall hoiſt the French flag, and that of the Sublime Porte, their ally, whoſe duration be eternal.

IV. The Sheiks and principal perſons of each town and village ſhall ſeal up the houſes and effects of the beys, and take care that not the ſmalleſt article ſhall be loſt.

V. The Sheiks, Cadis, and Imans, ſhall continue to exerciſe their reſpective functions; and put up their prayers, and perform the exerciſes of religious worſhip in the moſques and houſes of prayer. All the inhabitants of Egypt ſhall offer up thanks to the Supreme Being, and put up public prayers for the deſtruction of the beys.

May the Supreme God make the glory of the ſultan of the Ottomans eternal, pour forth his wrath on the Mamalouks, and render glorious the deſtiny of the Egyptian nation!"

BUONAPARTE's EXPEDITION.

WHATEVER may be the ultimate views of this enterprizing general, it now ſeems to be certain that Egypt was the firſt object of his operations. If the French mean to make it a kind of colony and the channel of a great trade, it is, no doubt, very advantageouſly ſituated for that purpoſe. Without any reference to its ancient flouriſhing ſtate, it is now in poſſeſſion of a conſiderable trade with Arabia, by the Red Sea; with Abyſſinia and the interior of Africa, by the Nile; and with Turkey and Europe by the Mediterranean. It was aſcertained by the Cuſtom-houſe accounts of Cairo, in the year 1783, that buſineſs was carried on in that city to the amount of between ſix and ſeven millions ſterling. Its exports in rice, corn, flax, and coffee, are nearly two millions. Conſidering Egypt merely in a commercial point of view, it muſt, therefore, hold out vaſt attractions to a nation which has already formed the project of occupying excluſively the commerce of the Levant. A project, the the execution of which is ſingularly favoured by the poſſeſſion of the Venetian Iſlands, by the French influence over all Italy; and laſtly, by the capture of Malta. But the views of France probably extend much farther, and ſhe may entertain hopes of carrying on trade with the Eaſt Indies by a way much ſhorter than the preſent one, and which, if equally ſafe, would doubtleſs be preferred. This idea was in agitation long before the revolution; and a plan to that effect was actually preſented by Baron de Tott to the Marſhal de Caſtries.

A com-

A communication with the East Indies would be naturally opened by the Red Sea, the navigation of which cannot be dangerous, as it is at present carried on by the Turks, who are but indifferent seamen. The number of their vessels employed in it do not exceed 30, and they depart once a year from Djedda, and arrive with the southerly winds at Suez, where they land their cargoes of gums, perfumes, India stuffs, and particularly the coffee of Yemen in Arabia. If, however, Egypt were in the hands of the French, they would of course make themselves masters of the Streight of Babelmandel, construct a port at Berenice, and perhaps succeed in clearing and refitting that of Suez. These two towns would be the storehouses from which merchandize might be conveyed by canals to Cairo and Alexandria.

With respect to the project of cutting through the Isthmus of Suez, it is evidently impossible from the nature of the soil, without mentioning any other obstacle. But this difficulty might be in some degree obviated, by restoring some canals which formerly existed, such as the canal of Suez to the lake Amer, and that from the same lake to the Nile (the remains of which are still apparent), and by making another from Berenice towards Captos: vessels of considerable burden could not navigate these canals, but it would be a sufficient advantage to have the merchandize transported by small craft. The cities which we have mentioned would become magazines where all the merchants of Europe might draw the different articles of the East-India trade. Timber-yards, docks, and arsenals, might be formed at Berenice, for the purpose of establishing a naval force; for, though there are no forests or woods in that part, ships might be easily built at Toulon, constructed in such a way as to take in pieces, which, being properly numbered, might be conveyed by sea to Alexandria, and from thence by canals, or on the backs of camels, to the new port in the Red Sea. One ship would be capable of carrying seven others in this manner. This scheme of first building ships, and afterwards putting them on-board of others, may appear ridiculous to some persons, but a model of the kind has been recently executed at Toulon; a ship has been actually built there which divides into eight parts.

The conquest of Egypt may be effected in as easy a way as that of Malta. Although the Grand Signior be considered as sovereign of it, the Mamalucks are in fact the rulers; for the Pacha, appointed by the Porte, has no more power than the Doge of Genoa, and the tribute to what is called the supreme power is very ill paid. The military force of the Mamalucks consists of 10,000 horse, and the infantry is scarcely worthy of notice. It is commanded by 24 beys, who are occasionally in a state of hostility with each other. There are neither forts, redoubts, nor artillery, and the unlimited power exercised by a licentious soldiery over the people, would naturally make the latter eager to shake off the yoke of oppression, and assist the French in the execution of their designs. From these considerations, it follows, that *Buonaparte* may gather new laurels in Egypt, without exposing himself to danger or to the risk of a failure, provided his troops can overcome the heat of that climate as they have done that of Italy.

Cairo, which hath opened its gates to the conqueror of Italy, is said, by Mr. Norden and Dr. Pococke, to have risen from the ruins of the Egyptian Babylon; an assertion, however, which is contradicted.

dicted by other authorities, which ſtate, that the ſmall town of Tinnah, twelve miles diſtant, ſtands upon the ſcite of that celebrated city. Cairo is called by the natives *Miſir ul Kaira*, or *the City of Anguiſh*, from the frequent ravages which the plague occaſions. It is ſituated on an artificial branch of the Nile, and is one of the largeſt and fineſt cities of the eaſt. The hall where Joſeph gave audience to his brethren, when they came to purchaſe corn in Egypt, ſtill remains. But the city is incapable of much reſiſtance, though there is a high rock in the center, with a caſtle upon it, which might make a vigorous defence, if the fortifications were not in a diſmantled ſtate.

The meſſage of the directory on the capture of Cairo merely ſtates, that Buonaparte, after the conqueſt of that capital, continued his march to his place of deſtination; but it leaves us uncertain as to the name of this place. This has given riſe to a variety of opinions with reſpect to the ultimate object of the expedition of the French. While ſome contend that he is about to march ſeventy miles through the deſert of Suez, to embark at that port, and to proceed to Babelmandel and the Malabar Coaſt; others ſend him up the Nile as far as Cophtos, to penetrate from thence through the deſert as far as Coſſeir by a march of forty leagues, with a view of embarking there for Babelmandel, and thus avoiding the Gulph of Suez, which is the moſt dangerous part of the Red Sea. Some again imagine, that Buonaparte intends to eſtabliſh himſelf in Egypt, after having conquered that country, and to render himſelf independent of the French republic. All theſe projects are obſtructed by great difficulties, and ſucceſs alone can juſtify the extravagance of them.

The caravans require only three or four days to make the journey from Cairo to Suez; but they are protected by the government of the country, which is hoſtile to Buonaparte. This government, it is true, is but little formidable in itſelf, but ſupported by the fanaticiſm of the Arabs, and incited by the Turks, it may ſeverely harraſs and greatly obſtruct his march. It keeps 9000 camels for the uſe of the caravans, which if they ſhould be removed, as in all probability they are, it will be impoſſible for the French to proceed on their march to Suez. The army might find veſſels at Suez ready for their reception; but we are juſtified in ſuppoſing that they have been either prevented from aſſembling, or have been ſince ſent away by the Egyptian government. So much for the firſt project.

On aſcending the Nile above Cairo, this river no longer branching out into different canals, as it does in the Delta, aſſumes a courſe the more rapid, as the northerly winds, which force the waters back at the mouth of the Nile, here loſe their influence. From this cauſe it becomes more difficult, and requires more time, to work up the river to the diſtance of 100 leagues. Arrived at Cofou, or Cophtos, the army has then to march through a deſert twice as long as that from Cairo to Suez, and this march becomes of courſe ſtill more impoſſible if the French cannot make uſe of the camels deſigned for the caravans. Cophtos is ſeparated from Coſſeir by a deep and barren valley, the paſſage through which is however practicable, as it has very good ſprings, yet in ſome places it is ſo narrow, that ſcarce three animals can paſs a-breaſt. The ſands and rocks, conſtantly affected by the ſcorching rays of the ſun, reflect a burning light, very hurtful to the eyes, and produce ſo intenſe a degree of heat, that it can hardly be ſupported. As the winds do not blow during

during the night, the travellers are expofed to the fuffocating exhalations of the burning fands. For thefe reafons, this road can only be paffed in the winter feafons.

It is by the port of Coffeir that the Egyptian corn is exported to Gedda, for the confumption of Arabia. In order to enfure the fuccefs of the expedition, it is requifite that the veffels employed in that export trade be found in that harbour, and confequently they muft not have been removed by order of the government of Egypt to the eaftern coaft of the Red Sea. Their number muft alfo be fufficient to convey all the baggage of fuch a confiderable army.

The execution of the fecond project is thus liable to great difficulties, nor is that of the third obftructed by obftacles lefs numerous and lefs formidable.

To fubject to the power of a regular government a people like the Arabs, who have for ages been accuftomed to acknowledge none; to rule men whofe manners and cuftoms are as little known as their language; to amalgamate the characters of two nations, which are the very reverfe of each other, and which for this reafon cannot fail to contract an infuperable antipathy againft one another; to fubject Muffulmen, and above all Arabs, the moft fanatical of all the adherents of Mahomet, to conquerors, who muft fcandalize themfelves by their drunkennefs and irregularities, become offenfive by their infolence towards the women, and difgufting by that vain and contemptuous tone, which renders the French odious to other nations; will be found a moft arduous tafk for Buonaparte. But the greateft obftacles arife from the climate.

It appears from numerous facts, that all hot countries prove extremely deftructive to the French. They will carry along with them into Egypt their intemperance, their diffipation, and debauchery; they will wifh to live there as there as they did in France, for it is a leading feature in the national character of the French, that with much levity in their tafte they tenacioufly adhere to their cuftoms. Burning and putrid fevers, pleurifies, and dyfenteries, will of courfe follow their exceffes, and diminifh their numbers. At the fame time they are cut off from all means of recruiting their army by the late defeat of the French fleet, by our cruizers, and by thofe of other nations, which this extravagant expedition has excited againft the French in the Levant.

They who reafon on the obftacles which Buonaparte is likely to meet with, calculate only the forces which he has to oppofe in Egypt; but to thefe forces fhould be added the troops which the Pachas of Syria and Paleftine, who according to the laft accounts are already marching againft the French, will bring into the field. They alfo do not compute the difficulties arifing from the want of the refources which the fecond armament, fhut up in the port of Toulon by the unexpected appearance of our fleet in the Mediterranean, was to convey to Egypt. The want of thefe refources is fo feverely felt by Buonaparte's army, that, according to the laft accounts from Malta, he had been obliged to drain that ifland of all kinds of provifions to fuch a degree, that the utmoft fcarcity prevails there at prefent.

Buonaparte muft therefore reft his hopes of fuccefs on thofe means only, which he took with him on-board his fleet; nor can he on any juft ground expect to be able to repair the numerous loffes, and

fupply

ſupply the wants which in point of men, arms, ammunition, proviſions, &c. his army muſt inevitably experience in its preſent detached and unſupported ſtate.

On the farther deſign of Buonaparte's expedition, and the practicability of the voyage to India, the following Obſervations on the Moonſons, extracted from the *Bombay Calendar*, muſt be intereſting:

"Our readers will not require to be told that our year is divided into two grand ſeaſons, or, as they are called, the *South Weſt* and *North Eaſt Monſoons*; that the firſt generally prevails from May to the middle of September incluſive, the other during the remaining months; yet we muſt premiſe this as an introduction to what follows.

"We need ſcarcely to obſerve, that during the *South Weſt Monſoon*, all the ports and roadſteds on this ſide of India deny approach; ſo much ſo, that, between the 15th of May and the 1ſt of September, ſhips are precluded by their policies from touching upon the Malabar coaſt, or from lying in Surat Roads between the 1ſt of May and the 1ſt of September. Generally ſpeaking, the monſoon is conſidered to extend from Dunderhead, the ſouthern extremity of Ceylon, to the Perſian Gulph; in order to attain which, they who ſhould ſail at this ſeaſon would be obliged to make what is called a ſouthern paſſage, that is, go firſt to the ſouth of the Equator, before they could ſtretch over to the weſtward; a voyage that would occupy, for Muſcat about 40 days, and to Buſſorah about two months: the ſame objection exiſts againſt ſailing at this ſeaſon to any part of the Arabian coaſt; as for the Red Sea, it is conſidered in vain to attempt entering it at this ſeaſon; nor can it be ſaid to be favourable to ſail now to the Cape, the Mauritius, or any port to the weſtward. To the other ſide of India, on the contrary, it is now the moſt advantageous period of departing. From the middle of April even to the middle of Auguſt, a voyage to Madras may be made in about twelve or fifteen days; to Bengal from fifteen to twenty days; after this time it becomes exceſſively tedious, from the neceſſity of keeping to the eaſtern ſide of the Bay to avoid the violent weather on the Coromandel coaſt: for the ſame reaſon the South Weſt Monſoon is eligible to leave Bombay for any of the ports in the Gulph of Bengal, or the Straits of Malacca; hence alſo it is the ſeaſon for ſailing to China: after the 20th of Auguſt, however, what is called the direct paſſage to China becomes very precarious, with much probability of finding blowing weather in the China ſeas. With regard to the ports from which ſhips may be expected to arrive at Bombay during this Monſoon, it may be laid down as a general rule, that the quarters favourable to ſail to during any ſeaſon, are thoſe that it is unfavourable to expect arrivals from, and *vice verſa*; hence, from the Perſian Gulph, the Red Sea, the Cape of Good Hope, and the weſtward in general, this is the moſt ſeaſonable period to expect arrivals: from Muſcat, a trip may now be made in ten or twelve days, from Mocha in twenty days, and Suez in about a month: it ſhould be remarked, that after September the Red Sea admits of no egreſs; ſhips conſequently remaining there beyond that time muſt continue there all the *North Eaſt Monſoon*, and are ſaid to have loſt their paſſage: on this account, the 25th of Auguſt is the lateſt day to which our cruizers are allowed to remain at Suez.—From the Cape a paſſage may be made in 5 or 6 weeks, from the Mauritius in three weeks or a month. The *South Weſt Monſoon* is alſo the moſt favourable ſeaſon in which a

paſſage may be made from Batavia or any ports to the eaſtward, through theſe ſouthern ſtraits: from Batavia to Bombay in particular, a paſſage may be made in about 35 days. From Madras and Bengal, during the South-weſt Monſoon, it is neceſſary to make the ſouthern paſſage in order to reach Bombay: this will require, in a paſſage from Madras, from thirty to forty days, and from Bengal from forty-five to ſixty days, from the neceſſity of working out of the river and beating down the Bay to clear Acheen head; from the Straits of Malacca it is an arduous taſk to ſail for this port, or even to any one on the peninſula of India, owing to the difficulty of working round Acheen head.

"We have now to treat of the *North Eaſt Monſoon*, or the ſeaſon which may be conſidered as included between the 15th of Auguſt and the 15th of April; in which the firſt circumſtance that occurs to us to remark is, that our coaſt is rendered in a peculiar manner ſecure and favourable to navigation; it is now conſidered the moſt eligible period for ſailing to the Perſian Gulph, and in general to all ports to the weſtward; to Muſcat the trip is generally fifteen, and to Buſſorah twenty-eight, days. The time ſuitable for ſailing to Mocha and Suez is, from the middle of February to the middle of March, when a paſſage may be made to the firſt in eighteen days, and to the ſecond in twenty-five. If a ſhip be delayed till the latter end of March or the beginning of April, the paſſage becomes more tedious, being then obliged to make the land to the ſouthward of the Iſland of Socatra, before the Gulph can be entered, on account of the ſoutherly winds which prevail, and a current ſetting to the northward. After the 15th of April, a ſhip bound to the Red Sea would be very likely to loſe her paſſage. Between the 15th of Auguſt and the 15th of September, it may be conſidered favourable to ſail to Madras and Bengal, but after this time the ſeaſon is ſuſpended, owing to the ſetting in of the *North Eaſt Monſoon* on the other ſide of India, which cloſes the ports on the Coaſt of Coromandel, Golconda, and Oriſſa, between the 15th of October and the 15th of December; at leaſt this period is excepted in common policies of inſurance: after this time again a paſſage may be made to Madras in thirty, and Bengal in fifty, days. This ſeaſon may be deemed unfavourable to the Coaſt of Pegne and the Straits of Malacca; but for the Straits of Sunda (Batavia, for example) it is the beſt adapted; a paſſage thither may be made in thirty-five days. With regard to the ſeaſonable imports in this Monſoon, it is at no time more advantageous than now for coming from the Coromandel Coaſt, and in ſhort the whole Bay: a paſſage may be made from Madras in twenty days, from Bengal in a month, and Penang a month. From the Perſian Gulph it is no leſs favourable, the paſſage from Muſcat being about ten days, and from Buſſorah twenty-eight. The Red Sea is now cloſed; nor is it reaſonable to expect arrivals from the Cape or the Straits of Sunda; from the latter in particular it is almoſt impoſſible at this ſeaſon to make a tolerable paſſage."

The following is Buonaparte's own account of his expedition, as far as it has reached, in his letters to the executive directory, dated head-quarters, Cairo, 6th Thermidor, 6th year, (24th July, 1798.)

On the 19th Meſſidor the army ſet out for Alexandria. It arrived at Demenhour on the 20th, having ſuffered greatly in traverſing this deſert, from exceſſive heat and want of water.

BATTLE

BATTLE OF RHAMANIE.—On the 22d we met the Nile at Rhamanie, and joined the division of General Dugua, who had proceeded to Rosetta, by forced marches. The division of General Desaix was attacked by a body of seven or eight hundred Mamelukes, who, after, a brisk cannonade, and the loss of some men, retired.

BATTLE OF CHEBREISSA.—In the mean time I learnt that Murat Bey, at the head of his army, composed of a considerable force of cavalry, with eight or ten large cannon, and several batteries upon the Nile, was advancing. We waited near the village of Chebreissa. On the evening of the 24th we began to march towards it. The 25th, at day-break, we arrived there. We had only 200 cavalry, wearied and harrassed. The Mamelukes had a magnificent body of cavalry, covered with gold and silver; arms of the best kind; carbines and pistols of the manufacture of London, the best sabres of the east, and mounted on the best horses on the continent. The army was ranged—each division forming a battalion four-deep, their baggage in the centre, and the artillery in the spaces between the battalions. The battalions were ranked, the 2d and 4th division behind the 1st and 3d. The five divisions of the army were placed *en echelons*, flanking each other, and flanked by two villages which we occupied.

Citizen Perree, chief of the division of marine, with three armed sloops, a chebeck, and a galley, proceeded to the attack of the enemy's flotilla. The battle was extremely obstinate. Perree, the chief of division, was wounded in the arm with a cannon ball; but by his good dispositions and his intrepidity gained possession of three sloops and a galley which the Mamelukes had taken, and set fire to their admiral's ship. Citizens Monge and Berthollet, who were in the chebeck, evinced at the most difficult moment the utmost courage. General Andreossi, who commanded the troops, conducted himself perfectly to my satisfaction.

The cavalry of the Mamelukes soon inundated all the plain, surrounded all the wings of our army, and pressed us on all sides in flank and in the rear; but they every where found our line was equally formidable, and opposed them with a double fire from the flank and front. They many times endeavoured to charge, but without determination. Some more bold skirmished with us, but they were received by the balls of the carabineers placed before the battalions. In fine, after having remained a part of the day at about half cannon-shot distance, they commenced their retreat and disappeared. We may estimate their loss at about three hundred men killed and wounded.

We had marched during eight days in want of every thing; and in one of the hottest climates in the world. On the morning of the 2d Thermidor, we perceived the Pyramids. The evening of the 2d, we found ourselves within six miles of Cairo; and I learnt that the twenty-three beys, with all their forces, were entrenched at Lambabe; that they had covered their entrenchments with more than sixty pieces of cannon.

BATTLE OF THE PYRAMIDS.—On the 3d, at day-break, we met their advanced guard, which we pursued from village to village. At two in the afternoon, we found ourselves at the enemies entrenchments. I ordered the divisions of Generals Desaix and Reynier to take a position to the right, between Gizah and Lambabe, in order to

cut off the communication of the enemy with the Higher Egypt, their natural retreat. The army was ranged in the ſame manner as at the battle of Chebreiſſa.

The inſtant that Murat Bey perceived the movement of General Deſaix, he reſolved to charge. He ſent one of the braveſt of his beys with a choſen body of troops, who charged the troops with the rapidity of lightning. We let them approach within fifty paces, when we overwhelmed them with a ſhower of balls, which made vaſt numbers fall on the field of battle. They threw themſelves between the ſpaces which formed the two diviſions, where they were received by a double fire, which finiſhed their defeat.

I ſeized the moment, and ordered the diviſion of General Bon, who was upon the Nile, to proceed to the attack of the entrenchments; and General Vial, who commanded the diviſion of General Menou, to proceed between the body of troops which had charged him and the entrenchments, in order to accompliſh this triple object: to prevent the body of troops from re-entering the entrenchments; to cut off the retreat of thoſe who occupied them; and, laſtly, if it ſhould be neceſſary, to attack the entrenchments on the left.—The inſtant Generals Vial and Bon advanced, they ordered the firſt and third diviſions of each battalion to range in columns for the attack, while the second and third preſerved the ſame poſition, forming always a battalion four deep, and advanced to maintain the columns of attack. The columns of attack of General Bon, commanded by the brave General Rampon, threw themſelves into the entrenchments with their uſual impetuoſity, notwithſtanding the fire of a great quantity of artillery when the Mamelukes charged them. They went out of their entrenchments at full gallop. Our columns had time to halt, and to form a front to oppoſe them on all ſides, and receive them with the bayonet, and a ſhower of balls. At the ſame inſtant, the field of battle was ſtrewed with the ſlain. Our troops ſoon carried the entrenchments. The Mamelukes, in their flight, precipitated themſelves, in crowds, on our left, but General Vial was poſted to receive them. A battalion of carabineers, under whoſe fire they were obliged to paſs, made a dreadful ſlaughter of them. A great number threw themſelves into the Nile and ſwam off.

More than 400 camels, loaded with baggage, and fifty pieces of artillery, fell into our power. I eſtimate the loſs of the Mamelukes at 2000 men, the choice of their cavalry. Great part of the beys were killed or wounded. Murat Bey was wounded in the cheek. Our loſs amounts to twenty or thirty killed, and one hundred and twenty wounded. During the night the city of Cairo was evacuated. All their armed ſloops, corvettes, brigs, and even a frigate, were burnt. On the 4th our troops entered Cairo. In the night the populace burnt the houſes of the beys, and committed many exceſſes. Cairo, which contains more than 300,000 inhabitants, has the moſt abandoned populace in the world.

After the great number of battles which the troops I command had gained over ſuperior forces, I thought it not prudent to praiſe their continence and *ſang froid* on this occaſion; for truly this new kind of warfare required, on their part, a degree of patience, forming a ſtrong contraſt with French impetuoſity. If they had abandoned themſelves to their full ardour, they would not have gained a victory which was only to be obtained by the greateſt coolneſs and patience.

patience. The cavalry of the Mamelukes ſhewed great bravery. They defended their fortunes; for there was not one of them on whom our ſoldiers did not find three, four, and 500 Louis d'ors.

All the luxury of theſe people conſiſted in their horſes and arms. Their houſes are wretched. It is difficult to find a country more fertile, or a people more miſerable, more ignorant, and more ſtupid. They prefer a button of our ſoldiers to a crown of ſix francs value. In the villages they do not even know the uſe of a pair of ſciſſars. They have no moveables but a ſtraw mat, and two or three earthen pots. In general they eat but few things. They do not know the uſe of windmills, ſo that we have conſtantly immenſe quantities of grain without any flour. The ſmall quantity of grain which they convert to flour, they bruiſe with ſtones; and in ſome of the large villages they have mills, which are turned by oxen.

We have been continually harraſſed by the Arabs, who are the greateſt robbers and the greateſt villains on earth, aſſaſſinating the Turks as well as the French, and all who fall into their hands. The general of brigade, Mureur, and ſeveral other aides-de-camp, and officers of the etat major, have been aſſaſſinated by theſe wretches. Concealed behind ditches, or in trenches, upon their excellent little horſes, unfortunate it is for him who ſtrays one hundred paces from the columns. General Mureur, notwithſtanding the repreſentations of the great precaution neceſſary to be obſerved, by a fatality which I have often remarked to accompany men arrived at their laſt hour, was deſirous to aſcend alone a little eminence, about two hundred paces from the camp. Behind it were three bedouins, who aſſaſſinated him: the republic has in him ſuſtained a real loſs; he was one of the braveſt generals I ever knew. There is in this country very little money, a great deal of corn, rice, vegetables, and cattle. The republic could not have a colony of more capacity, or richer ſoil. The climate is very healthy, owing to the freſhneſs of the nights. Notwithſtanding fifteen days of marching, fatigues of every kind, the abſolute want of wine, and every thing elſe to alleviate fatigue, we have had no ſickneſs. The ſoldiers have found great reſources in a kind of water-melons, which are in great abundance.

After giving an account of ſeveral ſkirmiſhes with the Arabs, the particulars of which are not very intereſting, he ſays:

On the 6th of July I wrote to the admiral to enter the port of Alexandria in twenty-four hours; and, if that was not practicable, to land immediately all the artillery and ſtores belonging to the army, and return to Corfu. I then left Alexandria, in the full aſſurance that, in three days, one of theſe meaſures would have been adopted. From that to the 24th of July, I received no intelligence whatever, either from Roſetta or Alexandria. A multitude of Arabs, collected from all parts of the deſert, kept conſtantly within five hundred toiſes of the camp.

On the 27th, at length, the report of our victories, and different poſitions, opened our communications. I received ſeveral letters from the admiral, when I learned, with aſtoniſhment, that he remained ſtill at Aboukir. I then wrote to him again, that he muſt not loſe an hour, but either enter the port of Alexandria, or return to Corfu. The admiral had written to me on the 20th of July, that ſeveral Engliſh frigates were come to reconnoitre, and that he was fortifying himſelf in expectation of the enemy at Aboukir. This ſtrange

ſtrange reſolution filled me with the moſt lively alarms; but the time was loſt; for the letter of the 20th did not reach me until the 30th of the ſame month. I diſpatched Citizen Julien, my aide-de-camp, with orders not leave Aboukir until he had ſeen the ſquadron under ſail. On the 26th the admiral wrote to me that the Engliſh had retired, which meaſure he attributed to want of proviſions. I received this letter, the 30th, by the ſame courier. The 29th he wrote to me, that he had at length heard of the victory of the Pyramids, and the taking of Cairo, and found a paſſage for entering the port of Alexandria; that letter I received the 5th of Auguſt.

On the night of the 1ſt of Auguſt, the Engliſh attacked him. On the moment he perceived the Engliſh ſquadron, he diſpatched an officer to appriſe me of his diſpoſitions and plans; this officer periſhed on the road. It ſeemed to me that Admiral Brueys was unwilling to return to Corfu before he had aſcertained the practicability of entering the port of Alexandria; and that the army, of which he had received no intelligence for a long time, was in a poſition in which it would not be obliged to retreat.—If in this calamitous event he was to blame, he has expiated his faults by a glorious death. The deſtinies have been deſirous to prove, on this occaſion, as on ſo many others, that, if they grant us a great preponderance on the continent, they have given the empire of the ſeas to our rivals; but, however great this reverſe, it is not to be attributed to the fickleneſs of fortune. She has not yet abandoned us. Far from it; ſhe has favoured us in the whole expedition in a degree ſurpaſſing all her former efforts. When I arrived before Alexandria, and learned that the Engliſh had been there a few days before with a ſuperior force; notwithſtanding the tempeſtuouſneſs of the weather, I threw myſelf onſhore at the riſk of being wrecked. I remember, at the moment when preparations were making for landing, there was a ſignal in the offing of an enemy's ſail.—I marched all night; at break of day I attacked Alexandria with 3000 harraſſed men, without cannon, and nearly without cartridges; and in five days I became maſter of Roſetta, of Demenhour; that is to ſay, I am already eſtabliſhed in Egypt.

For theſe five days was the ſquadron ſheltered from the enemy, however great might be their number? far from it, it remained expoſed during the remainder of the month of July. It received from Roſetta, about the 20th of that month, a ſupply of rice for two months. The Engliſh, in ſuperior force, were for ten days in theſe parts. On the 29th of July it received intelligence of our entire poſſeſſion of Egypt, and our entry into Cairo; and it was only after Fortune ſaw that all her favours were become of no farther uſe, that ſhe abandoned our fleets to its deſtiny. BUONAPARTE.

To ſpeak of the conqueſt of Egypt by Buonaparte, is perfectly ridiculous. The country which he has overrun does not exceed one hundred miles in length. The length of Upper Egypt, into which he has not penetrated, and which is incomparably a more difficult country, is four hundred miles. The moſt advanced poſt which he even intends to occupy on that ſide is Fayoum, a ſmall diſtance beyond the pyramids, and about thirty miles beyond Cairo. On carefully examining the French diſpatches, the beys ſeem to us to have conducted their defenſive warfare with prudence and ſkill. They ſeem not to have hazarded a general action, but to have contented themſelves with

with detaching bodies of Mameluke cavalry to harrafs the enemy on their march. All the battles and victories of Buonaparte amount, in truth, only to fkirmifhes with fuch detachments.

There is no reafon to doubt that Egypt, in a long courfe of tranquillity, and by the perfevering exertions of induftrious fkill, might be made a productive and valuable colony. But a colony is not the work of a moment. Many years of quiet, good management, and good fortune, are neceffary to produce a fenfible improvement in a great country. Egypt might indeed be made of great value in half a century, but is of no value to a plundering invader. It does not, like Bengal or Peru, offer immediate booty to the fpoiler. It only prefents the hope of diftant but permanent wealth, to be flowly earned by a juft and wife adminiftration.—It has no mines to be wrought, no private or public hoards to be feized, no merchants or manufacturers to be robbed, no opulent landholders to be plundered. It is at prefent poor, though it has a capacity of becoming rich. The cultivation of a country is not to be improved, nor the habits of a great people changed, in a few months, by an army of 20,000 men, detefted by the inhabitants, ftrangers to their language, alien from their manners, occupied with the care of their own fafety, and cut off from all hope of reinforcement or fuccour. It is even probable that Buonaparte's will be in danger of want, if their ftay be long; for, fertile as the foil of Egypt is, yet fo wretched is the cultivation, that few countries in the eaft have been more fubject to frequent and terrible famines. This is a fact attefted by all the Europeans who have vifited Egypt, but efpecially by that intelligent traveller, Mr. Volney, whom we have already quoted. Far, therefore, from dreaming of a permanent eftablifhment, we doubt whether the French army will find a temporary provifion in the ancient granary of the world. It feems to us very probable, that it will moulder away under the vexatious hoftility of the natives, and the ftill more effectual hoftility of difeafe, of a fultry fun, and of fcanty provifions. If fhipping had been provided at Suez to tranfport Buonaparte to Mangalore, the Egyptian expedition might have been regarded as a daring and brilliant, though ambiguous and perilous, project. But the filence of the difpatches completely demonftrates that no preparations are made for an attack on India; and this we confider as by far the moft important intelligence which thefe difpatches contain.

News, fince received through the channel of the Turkifh ambaffador, ftates, that the beys of Egypt having affembled a ftrong force in the vicinity of Cairo, under the direction of Englifh officers, a very fanguinary battle was fought on the 9th of October between them and Buonaparte. The beys met with a vigorous refiftance, but at laft fucceeded in diflodging the French from the capital of Cairo and its environs, and forced them to fall back to Rofetta. The action lafted the whole day, and the lofs in flain and wounded is very confiderable on both fides. The divan is in daily expectation of receiving intelligence of the French having capitulated in Egypt, as they could neither advance nor retrograde, and as their fupplies of provifions were entirely cut off.

If the accounts brought by the Hamburgh mail dated October 13, 1798, be confirmed, we may prepare ourfelves to hear of an end being put to the fhort but brilliant career of the moft celebrated adventurer fince the days of Charles XII.

The following extract is taken from an intercepted letter of a principal officer in Buonaparte's army, to his parents at Paris.

"Leaving Alexandria to re-embark on the Nile, you pass a desert perfectly destitute of all herbage, on which, at the distance of every four or five leagues, you meet with a well of bad water. Imagine what must be the situation of an army obliged to cross these barren plains, which do not even offer the traveller shelter against the insupportable heat which prevails there. The soldier who is forced to carry with him five days provisions, laden with his knapsack and his water-skin, after having marched about an hour, finds himself overcome by the heat, and throws away his provisions and every thing that adds to his fatigue, regardless altogether of to-morrow. Hunger and thirst soon attack him, without his having the means of satisfying either; and thus, in the dreadful passage of this desert, we behold them dying under the pressure of these calamities, while their comrades, seeing how much they suffer, blow out their brains, or throw themselves into the Nile. Every day's march presented to our view some such spectacles as these; and, what will hardly be believed, the whole army, during a march of seventeen days, never tasted bread. They were fed during the whole of that time upon lemons and water melons, and pulse and some poultry which we found in the country. Such has been the food of all, from the general to the lowest soldier; and the general has often fasted from eighteen to twenty-four hours, because the private men, having arrived first in the villages, gave every thing up to pillage, and he was therefore reduced to the necessity of feeding on the refuse of what his troops' intemperance left him."

The writer gives the following account of Egypt and the Mamelukes.—France, by the different events of the war and the revolution, having lost her colonies and her factories, must be reduced to the necessity of seeing her commerce decline, and her industrious people obliged to obtain the most essential articles at second hand. Several considerations induce us to consider it as impossible for government to recover its colonies, or at least to derive from them the same advantages which it had been accustomed to do, particularly after the destruction and the horrors which have been committed there since the emancipation of the negroes in the islands. In order to indemnify themselves for this loss, the directory turned their eyes towards Egypt and Syria, countries which, from the goodness of their soil and their fertility, are capable of being of the utmost utility to the commerce of France, as an abundant granary, and, in process of time, the medium of its commerce in India. It cannot admit of a doubt that, after having made ourselves masters of this country, we may extend our views still farther, and in the end destroy the commerce of the English in the Indies, turn that commerce to our own advantage, and become masters of all the trade of Africa and Asia.

Such, it appears to me, are the considerations which have induced our government to attempt the present expedition against Egypt. This part of the Ottoman power has for several ages been governed by a species of men called Mamelukes, who, having a number of beys at their head, despise the authority of the Grand Seignor, and rule in a despotic and tyrannic manner over a country which, in the hands of a politic nation, must become a source of wealth. It is therefore

therefore with the Mamelukes that we muſt make war, in order to obtain poſſeſſion of Egypt. The number of theſe is about 12,000, all cavalry, and they are under the command of twenty-four beys. It may perhaps be proper to give you ſome idea of their ſoldiers, their manner of making war, and their arms, as well as of their origin.

Every Mameluke is originally a ſlave by purchaſe; they are chiefly from Mount Caucaſus, in Georgia; but there are among them Germans, Ruſſians, and even ſome French; their religion is that of Mahomet; being bred from their infancy to the art of war, they are particularly ſkilful in the management of horſes, in the uſe of the carbine, piſtol, and battle-axe, in throwing lances, and in the uſe of the ſabre. Every Mameluke has two or three ſervants, who always follow them on foot, even when they go to battle. The arms of a Mameluke on horſeback are two great muſkets, which a ſervant on each ſide of him carries; theſe he only diſcharges once; he then ſeize two pair of piſtols which he carries in his girdle, and afterwards eight arrows which he has in a quiver, and which he throws with his hand with great ſkill. After this he takes to the battle-axe, which he employs for the purpoſe of knocking down his enemy; and, if this fails, his laſt reſource is two ſabres. He takes the birdle of his horſe between his teeth, and, armed with a ſabre in each hand, he runs at his opponent, and cuts on every ſide of him.

The town of Roſetta, to which, according to the laſt German papers, Buonaparte has been compelled to retreat, is wholly devoid of fortifications on the land ſide. On that towards the ſea, Savary tells us, in his Letters on Egypt, "There is a caſtle built by the Mamelukes, to defend the paſſage of the river. It is a ſquare building, flanked with towers, and furniſhed with artillery. It ſtands a league north of the town, on the weſtern bank of the Nile. On the oppoſite ſide is a platform, provided alſo with cannon; and theſe two forts, inconſiderable as they are, would be ſufficient to impede the entrance of ſhips, if the Turks underſtood gunnery. Here, however, they are ſafe, as Nature has been careful to defend the mouth of the Nile, by throwing up a dangerous bar, which is the terror of mariners. The lands around Roſetta are remarkable for producing excellent rice."

DREADFUL HURRICANE AT HALIFAX IN AMERICA.

ON Tueſday the 25th of September in the forenoon, the atmoſphere appeared thick, the ſky louring, and every thing gave tokens of an approaching gale. The wind, nearly ſouth, about noon began to freſhen into a heavy breeze, and backened towards the eaſtern board to about S. E. Between four and five o'clock P. M. a ſmart ſhower of rain paſſed over, which ſeemed to have given additional force to the wind. The veſſels in the harbour exerted every means which might enable them to withſtand its fury, which by this time produced a conſiderable ſwell in the road. The firſt ſhip which began to drift, notwithſtanding all theſe neceſſary precautions, was the Penelope, an American veſſel, acquitted but a few days before by the admiralty; ſhe fell athwart the bows of a Daniſh veſſel, recently brought in for examination. The Dane's bowſprit carried away the Penelope's mizen-maſt: the latter then got clear, and ſoon after was driven up towards the navy-yard. The gale now encreaſed to a moſt tremendous

dous violence, veered from the eaſtward, and blew directly up the harbour. The ſea ran dreadful, and daſhed in pieces almoſt every thing which oppoſed it. The prize veſſels lately ſent in by the Prevoyante, the tranſports, with the troops on-board, nearly ready to ſail for Bermuda, and many other veſſels, were hurried before it, without being able to make the leaſt reſiſtance. The tide, which ſhould have ceaſed riſing by eight o'clock, continued to flow until near nine. The wharfs were nearly all under water; the timber began to give way, and the veſſels faſtened to them aſſiſted in dragging them into the harbour. The moon, which occaſionally broke through the clouds, diſcloſed a proſpect which baffles all deſcription: ſhips driving before the hurricane nearly on their beam ends, others actually upſet, many with their maſts torn by the board; wharfs and ſtores filled with valuable merchandize, daſhed into atoms; and in ſhort, one continued ſcene of devaſtation and ruin, the whole length of the town, from the king's lumber-wharf to the navy-yard.

The brig Betſey, nearly ready to ſail for London with a valuable cargo of ſugars, &c. drove from the Long-wharf, together with the ſhip Liberty (a large re-taken American veſſel that had juſt landed her cargo); the head of the Liberty was towards the town, and in her paſſage up the harbour, ſhe ran foul of and dragged many other veſſels adrift, which might otherwiſe have ſuſtained the tempeſt without much injury. The ſhip Matilda, belonging to Mr. Anderſon, and a coaſting ſloop, were completely upſet. A ſchooner belonging to Meſſrs. Pryors, drove from their wharf, and forced a paſſage through the next wharf, nearly thirty feet from its head. The ſtores occupied by Meſſrs. Lawſons, on Auſtin and Kidſton's wharfs, were beat down by a brig which drove from Tremain's wharf; and ſugars, rice, &c. to a conſiderable amount, almoſt entirely deſtroyed.—Many thouſands will be expended, and much time elapſe, before the front of the town will regain its appearance anterior to this deſtructive tornado.

On the morning following, the harbour exhibited an appearance truly melancholy; ſcarcely a ſingle veſſel continued to ride, except the king's ſhips, the packet, and the Earl Moira; the Matilda lying nearly bottom upwards on the beach leading to the navy-yard—the ſloop before-mentioned a little diſtance from her—the ſhips Penelope, Liberty, a tranſport, and a ſchooner commanded by Capt. Elmſlie, were driven quite up to the walls of the dock-yard: above it, high on the beach near the navy-hoſpital, lay two of the veſſels lately ſent in by the Prevoyante; on the Dartmouth ſide, at the entrance of the Narrows, a large ſhip laden with cocoa and tobacco, lately ſent in by the Lynx, lay bilged; a little farther down the harbour, a Daniſh ſhip with a cargo of ſugars, &c. the Ann tranſport, and the brig Betſey, were ſtranded. The veſſels are now unlading, and it is thought will be ſaved, as will probably near the whole of their reſpective cargoes. One brig, the William, laden with ſugar and molaſſes, prize to the Prevoyante, went on-ſhore near what is called the Black Rock, was entirely daſhed to pieces, and the whole cargo loſt—on-board the latter, periſhed an unfortunate young gentleman (Mr. Sutherland), belonging to the Prevoyante; but we are happy to learn, that amidſt all this tumult and deſtruction, but few lives were loſt.

The

The damage is computed at fully 100,000l. The Lynx sloop of war had a most singular escape, after driving from her anchors, she ran foul of another man of war, and, in passing her, she fortunately hooked one to the other ship's anchors in her aftermost port, which she carried off with the cable to it, and by this she out-rode the whole gale with her stern to the wind, as the other man of war was luckily so well moored as to hold them both. The appearance of the country after the storm was singular, every tree and vegetable was blighted and withered as if they had been scorched with fire.

LIFE OF ZIMMERMAN.—Abridged from TISSOT.

JOHN George Zimmerman was born in December 1728, at Brug, a town in the German part of the canton of Bern. His father, the senator Zimmerman, was born of a family which had been distinguished, during several ages, for the merit and integrity with which they passed through the first offices of the government. His mother, of the name of Pache, was the daughter of a celebrated counsellor at Morges, in the French part of the same canton; which accounts for the circumstance of the two languages being equally familiar to him, though he had passed only a very short time in France. Young Zimmerman was educated at home till he reached the age of fourteen, when he was sent to study the *belles lettres* at Bern. After three years had been thus employed, he was transferred to the school of philosophy; where the prolix comments on the metaphysics of Wolf seem much more to have disgusted than enlightened him. The death of both parents leaving him at liberty to choose his destination in life, he determined to embrace the medical profession, and went to Gottingen in 1747. Here his countryman, the illustrious Haller, took him into his own house, directed his studies, and treated him as a son and a friend. Besides the proper medical professors, Zimmerman attended the mathematical and physical lectures, and gained a knowledge of English literature. He passed four years in this university; part of the last of which he employed in experiments on the doctrine of irritability, first proposed by the English anatomist Glisson, and afterwards pursued with so much success by Haller. Zimmerman made this principle the subject of his inaugural thesis, in 1751; and the clearness of style and method with which he explained the doctrine, with the strength of the experimental proofs by which he supported it, gained him great reputation. Our anatomical readers are doubtless acquainted with the controversies which this new system excited. Though Haller was generally considered as its author, several attacks were directed against Zimmerman in particular, which he was wise enough to disregard, leaving his facts to speak for themselves.

After a few months spent in a tour to Holland and France, he returned to Bern in 1752, where he was received with great cordiality. In this year he published an account of Haller, in a short letter to a friend, inserted in the journal of Neufchatel, and written in French. Though his only work in that language, it has much elegance of style; and it was the basis of his life of Haller which was published at Zurich in 1755, a large 8vo. in German. During his stay at Bern, he married a very amiable and cultivated lady, a relation of Haller, of the name of Meley, then widow of a M. Stek.

Shortly afterwards, the poſt of public phyſician to his native town of Brug becoming vacant, he received an invitation to occupy it, with which he complied. Here he earneſtly devoted himſelf to the ſtudies and duties of his profeſſion; not neglecting, however, thoſe literary purſuits which are neceſſary to fill up the time of a man of education, in a place which affords few of the reſources of ſuitable ſociety. He amuſed himſelf occaſionally with writing little pieces, which he ſent to a journal printed at Zurich under the title of the Monitor. As his pleaſures were almoſt excluſively confined to his family and his ſtudy, he here contracted that real or ſuppoſed love for ſolitude, which gave ſuch a colour to his writings, if not to his life. It ſeems, however, at firſt to have been rather forced than natural; and to have been the ſplenetic reſource of a man who was never well ſatisfied with the obſcurity of a ſituation, which was by no means adequate to his talents and reputation. In this place, his years paſſed on uſefully for the improvement of his mind: but, as it appears, not very happily. His natural ſenſibility, from a want of objects to divert it, preyed on itſelf; and he was rendered miſerable by a thouſand domeſtic cares and anxieties, which he would have felt much more lightly in the tumult of public life. He took, however, the beſt method in his power for relief, by employing his pen with aſſiduity on profeſſional and literary topics. In 1754, he ſent to the Phyſico-Medical ſociety of Baſil a very good caſe of ſpaſmodic quincy, together with ſome obſervations on the Hyſteric Tumours of Sydenham. In 1755 he compoſed a ſhort poem in German on the earthquake of Liſbon, which was much eſteemed by adequate judges, and placed him among the earlieſt improvers of that language. In 1756 appeared his firſt Eſſay on Solitude, a very ſhort performance. Two years afterwards, he began to enlarge its plan, and to collect materials for his more extended publication on this ſubject. He alſo formed the plan of his work on the Experience of Medicine, of which the firſt volume appeared in 1763. In 1758 he publiſhed his Eſſay on National Pride, which paſſed with rapidity through ſeveral editions, and was tranſlated into foreign languages, and much admired. In this performance is one of thoſe predictions of an approaching revolution in Europe, which are to be found in various works of literature, but, as his biographer M. Tiſſot thinks, no where with more ſagacity and exactneſs. "The univerſal ſpread of light and philoſophy, the vices demonſtrated in the exiſting mode of thinking, the attacks on received prejudices, all ſhew a boldneſs in opinion which announces a revolution; and this revolution will be happy if it be directed by political wiſdom, and ſubmiſſion to the laws of the ſtate: but, ſhould it degenerate into criminal audacity, it will coſt to ſome their property; to others, their liberty; to many, their life."

Notwithſtanding a copious medical practice, now extended by many foreign conſultations, and the literary employment of his leiſure, Zimmerman's diſcontent with his ſituation was ſuch, that his friends, and particularly M. Tiſſot, made various efforts to procure him a new eſtabliſhment; none of which were as yet ſucceſsful. It appears, indeed, that his own irreſolution, and a kind of timidity which always adhered to him, were the principal obſtacles in ſome inſtances. Meantime, however, he did not ceaſe to lay the ſolid foundations of more extenſive fame by profeſſional writings. An epidemic fever, which

which reigned in Switzerland in the years 1763, 4, and 5, and which in the latter year changed to a dysentery, furnished him with a copious store of observations, and produced his Treatise on the Dysentery, which gained him great reputation. This was the last considerable medical work that he composed, though he continued to write short pieces on occasional topics. It should not be omitted, that his cordial friend, M. Tissot, by addressing to him his own letters on the prevailing epidemic, contributed to extend his professional fame.—At length, the vacant post of physican to the King of England at Hanover, which had been offered to M. Tissot, was by his interest procured for Zimmerman; and being accepted, he removed to Hanover in 1768.

This new situation, however, was far from producing the accession of happiness which was expected from it.

"I hoped (says his biographer) that his departure would be the era of his entrance on a happier career, and I felicitated myself on having contributed to it: but I was in a short time sadly convinced of the contrary. A few days after his arrival, he lost the lord of the regency who was most attached to him. The disorder, of which I have mentioned the commencement while he resided at Brug, (a species of hernia,) constantly increased, and was accompanied with acute pains, which sometimes rendered irksome the execution of his duty. The jealousy of a colleague caused him a number of those slight irritations which he would not have felt when in health, but which the state of his nerves now rendered almost insupportable. Some persons thought that he would do any thing to conciliate their good will, and would have had him every moment with them. 'Women who drank coffee with George II. persuade themselves that I ought to be at their command, as I should have been at his.' They would have made him their slave, and this was a part not adapted for him. He knew that it was for the disease, not the patient, to regulate the number and the hours of a physician's visits; and he always acted on this principle: but the persons whose caprices he thwarted did not take pains to make his abode agreeable. The health of his wife, which always determined his own, declined rapidly; while that of his children, which had never been strong, did not become so. He often wrote to me from Hanover, as he had done from Brug, 'Save my wife, or rather save myself; save these children who are dearer to me than life;' and every one of his letters gave me real regret as having contributed to his removal. Luckily, the public confidence soon forced him to a continued occupation, which is the surest resource against uneasiness. His patients in Hanover, consultations from all the north, and patients who themselves came to consult him, at length dispelled his melancholy. He passed whole months in incessant occupation; and the greatest relaxations that he ever knew consisted in some visits to princes, who wished for his advice in cases of great importance, and whom he never quitted without having inspired them with as much regard as esteem; and in some journies to Pyrmont, where he passed part of the water-season."

In 1770, he had the misfortune of losing his wife; a deprivation which touched him most sensibly; and at the same time his own complaint grew worse. His friend Tissot advised him to seek the best chirurgical assistance, and persuaded him, in 1771, to go to Berlin and put himself under the care of the celebrated Meckel.

He was received into this ſurgeon's houſe, and an operation was performed which ſucceeded. The time of his convaleſcence was one of the moſt agreeable in his life. He made a number of acquaintances among diſtinguiſhed characters at Berlin, was preſented to the king, and was honoured with particular notice from him. His reception on his return to Hanover was equally pleaſing. He now again plunged into buſineſs, and again domeſtic and profeſſional cares brought on hypochondriacal complaints. In 1775, by way of vacation, he made a journey to Lauſanne, where his daughter was placed for education, and paſſed five weeks with M. Tiſſot. As this was the firſt time that theſe intimate friends, of twenty years ſtanding, had ſeen each other, we ſhall tranſlate ſome of the biographer's obſervations:

"I had at length the pleaſure of ſeeing him; I ſhall not ſay of knowing him. I found that I knew him already; the friend converſing reminded me every moment of the friend writing, and perfectly reſembled the portrait which I had drawn of him. I ſaw the man of genius, who with promptitude ſeizes an object under all its relations, and whoſe imagination knows how to preſent it under the moſt agreeable forms: his converſation was inſtructive, brilliant, ſprinkled with a number of intereſting facts and pleaſant narrations, and animated by an expreſſive countenance. He ſpoke of every thing with great preciſion. When medicine was our ſubject, as was frequently the caſe, I found his principles ſolid and his notions clear; when I took him to ſee patients under ſevere indiſpoſitions, or read to him conſultations on the moſt difficult caſes, I always found in him the greateſt ſagacity in diſcovering cauſes and explaining ſymptoms, great juſtneſs in forming indications, and an exquiſite judgment in the choice of remedies, of which he employed few, but all efficacious. In fine, on every occaſion, I ſaw the man of ſincerity, rectitude, and virtue. His ſtay was much ſhorter than I could have wiſhed."

Zimmerman was unhappy in the fate of his children. His amiable daughter, whom he moſt tenderly loved, fell into a lingering malady ſoon after ſhe left Lauſanne, which continued for five years, and then carried her off:—while his ſon, who was from infancy troubled with an acrid humour, after various viciſſitudes of nervous affections, ſettled in perfect idiocy; in which ſtate he remained. To alleviate theſe diſtreſſes, a ſecond marriage properly occurred to the minds of his friends, and they choſe for him a moſt ſuitable companion, in the daughter of M. de Berger, king's phyſician at Lunenburg. The union took place in 1782, and proved the greateſt charm and ſupport of all his remaining life. His lady was thirty years younger than him, but ſhe perfectly accommodated herſelf to his taſte, and induced him to cultivate ſociety abroad and at home more than he had hitherto done. About this time, he employed himſelf in completing his favourite work on Solitude; which, at the diſtance of thirty years from the publication of the firſt eſſay on the ſubject, appeared in its new form in the year 1786, in 4 vols. His ideas of ſolitude had probably been ſoftened by ſo long an intercourſe with the world; and as he now defined it, "that ſtate of the ſoul in which it abandons itſelf freely to its reflections," it was not neceſſary to become either a monk or an anchorite in order to partake of its benefits. Had it not been preſented under ſo accommodating a form, a philoſopher might have

have ſmiled at the circumſtance of a recommendation of ſolitude, from a court phyſician, becoming the favourite work of one of the moſt ſplendid and ambitious of crowned heads. The Empreſs of Ruſſia ſent her expreſs thanks to the author for the pleaſure which ſhe had derived from the work, accompanied with a magnificent preſent, and commenced with him a regular correſpondence, which ſubſiſted with great freedom on her part till 1792; when ſhe ſuddenly dropped it. She alſo gave him an invitation to ſettle at Peterſburgh as her firſt phyſician; and, on his declining the offer, ſhe requeſted his recommendation of medical practitioners for her towns and armies, and conferred on him the order of Wladomir.

One of the moſt diſtinguiſhed incidents of his life was the ſummons which he received to attend the great Frederic in his laſt illneſs, in 1786. It was at once evident that there was no room for the exerciſe of his medical ſkill; but he improved the opportunity which he thus enjoyed of confidential intercourſe with that illuſtrious character, whoſe mental faculties were pre-eminent to the laſt; and he derived from it the materials of an intereſting narrative, which he afterwards publiſhed. The partiality of this prince in his favour naturally diſpoſed him to a reciprocal good opinion of the monarch; and in 1788 he publiſhed "A Defence of Frederic the Great againſt the Count de Mirabeau;" which was followed by "Fragments on Frederic the Great," in 3 vols. 12mo. All his publications relative to this king gave offence to many individuals, and ſubjected him to ſevere criticiſm; which he felt with more ſenſibility than conſiſted with his peace of mind.—His religious and political opinions, likewiſe, in his latter years, began to be in wide contradiction with the principles that were aſſiduouſly propagated all over Europe; and this added perpetual fuel to his irritability. The ſociety of the Illuminated, coaleſced with that of Free-Maſons, roſe about this time in Germany, and excited the moſt violent commotions among men of letters and reflection. It was ſuppoſed to have in view nothing leſs than the abolition of Chriſtianity, and the ſubverſion of all conſtituted authorities; and, while its partizans expected from it the moſt beneficial reforms of every kind, its opponents dreaded from it every miſchief that could poſſibly happen to mankind. Zimmerman, who is repreſented by his friend as a *hunter of ſects*, was among the firſt who took alarm at this formidable aſſociation. His regard for religion and ſocial order, and perhaps his connexions with crowned heads, cauſed him to ſee in the moſt obnoxious light all the principles of theſe new philoſophers. He attacked them with vigour, formed counter-aſſociations with other men of letters, and at length took a ſtep which we leave his friends to juſtify,—that of addreſſing to the Emperor Leopold a memoir, painting in the ſtrongeſt colouring the pernicious maxims of the ſect, and ſuggeſting the means of ſuppreſſing it; means which we underſtand to have depended on the deciſive interference of civil authority. Leopold, who was well inclined to ſuch meaſures, received his memoir very graciouſly, and ſent him a letter and ſplendid preſent in return; but his death, ſoon afterwards, deprived the cauſe of its moſt powerful protector. Zimmerman, however, in conjunction with Hoffman of Vienna, who had inſtituted a periodical work on the old principles, did not relax in their zeal. They attacked and were attacked in turn; and Zimmerman, unfortunately, embroiled himſelf with the courts of law by a paper pub-

lished in Hoffman's Journal, intitled "The Baron de Knigge unmasked as an Illuminate, Democrat, and Seducer of the People." As this charge was in part founded on a work not openly avowed by the baron, a process was instituted against Zimmerman as a libeller, and he was unable to exculpate himself. This state of warfare may well be imagined to be extremely unfriendly to an irritable system of nerves; and the agitation of the doctor's mind was farther increased by his personal fears on the approach of the French towards the Electorate of Hanover, in 1794. The idea of becoming a poor emigrant perpetually haunted him, nor could the negociation that secured the country restore him to tranquillity. Its melancholy effects are thus described by his biographer:—

"From the month of November, he had lost sleep, appetite, strength, and flesh. This state of decline continually advanced. In January, he still paid some visits in his carriage, but often fainted at the top of the staircase. Writing a recipe was a labour to him: he complained sometimes of confusion in his head, and at length quitted all business. This was at first deemed an hypochondriac fancy, but it was soon perceived that a settled melancholy did not permit him long to follow the train of his ideas.—That happened to him which has happened to so many men of genius: one strong idea obtained the ascendancy over all the rest, and subdued the soul, which was unable to remove it out of sight. Preserving all his presence of mind, and the clearness of his conceptions, on all other objects, but no longer chusing to occupy himself with them, incapable of all labour, and not giving even his advice without difficulty, he continually saw the enemy plundering his house, as Paschal always saw a globe of fire at his side; Bonnet, an honest man robbing him; and Spinello, the devil standing opposite to him. He used some remedies, and took a journey, but all to no purpose. He re-entered his house with the same idea with which he quitted it; persuaded himself that he saw it pillaged; and fancied he was entirely ruined. This notion impressed him so strongly, that his abstinence from food at last was partly attributed to his fear of poverty. He was worn away to a skeleton, became decrepid, and at sixty-six died of old age. He expired October 7, 1795."

ON BLINDNESS, AND THE SURPRISING FACULTY OF BLIND PERSONS. From the *Encyclopædia Londinensis.*

THERE is not, perhaps, any sense or faculty of the corporeal frame, which affords so many resources of utility and entertainment as the power of vision; nor is there any loss or privation which can be productive of calamities so multiform or bitter as the want of sight. By no avenue of corporeal perception is knowledge in her full extent, and in all her forms, so accessible to the rational and inquiring mind, as by the glorious and delightful medium of light. For this not only reveals external things in all their beauties, but gives body, form, and colour, to intellectual ideas; so that the whole material and intelligent creation lie in open prospect, and the majestic frame of nature, in its whole extent, is, if we may so speak, perceived at a single glance. To the blind, on the contrary, the visible universe is totally annihilated; he is conscious of no space but that in which he stands, or to which his extremities can reach. Sound, indeed, gives him

some

ſome ideas of diſtant objects; but thoſe ideas are extremely obſcure and indiſtinct. They are obſcure, becauſe they conſiſt alone of the objects whoſe oſcillations vibrate on his ear, and do not neceſſarily ſuppoſe any other bodies with which the intermediate ſpace may be occupied, except that which gives the ſound alone: they are indiſtinct, becauſe ſounds themſelves are frequently ambiguous, and do not uniformly and excluſively indicate their real cauſes. And though by them the idea of diſtance in general, or even of ſome particular diſtances, may be obtained; yet they never fill the mind with thoſe exalting ideas of extenſion which are inſpired by ocular perception. For though thunder, or an exploſion of cannon, may be diſtinctly heard, after they have traverſed a great ſpace, yet, when the diſtance is very extenſive, it ceaſes to be indicated by ſound; and therefore the ideas, acquired by auricular experiment, of extenſion and interval, are extremely confuſed and uncertain. The living and comprehenſive eye darts its view over expanſive valleys, lofty mountains, protracted rivers, illimitable oceans. It meaſures, in an inſtant, the mighty ſpace from earth to heaven, or from one ſtar to another. By the aſſiſtance of teleſcopes, its horizon is almoſt indefinitely extended, its objects multiplied, and the ſphere of its obſervation infinitely enlarged. By theſe means, the imagination, inured to vaſt impreſſions of diſtance, is enabled, not only to recal them, in their greateſt extent, with as much rapidity as they were at firſt imbibed; but can multiply them, and add one to another, till all particular boundaries and diſtances are loſt in immenſity. Thus nature, by profuſely irradiating the face of things, and clothing objects in a robe of diverſified ſplendour, not only invites the underſtanding to expatiate on a theatre ſo extenſive, but entertains the imagination with every poſſible exhibition of the ſublime and beautiful. The man of light beholds the objects of his attention and curioſity from far. Taught by experience, he meaſures their relative diſtances; diſtinguiſhes their qualities; determines their ſituations and attitudes; preſages what theſe tokens may import; ſelects his favourites; traverſes in ſecurity the ſpace which divides them from him; ſtops at the point where they are placed; and either obtains them with eaſe, or perceives the means by which the obſtacles that intercept his paſſage to them may be ſurmounted. The blind, on the contrary, not only may be, but really are, during a conſiderable period, apprehenſive of danger in every motion towards any place, from whence their contracted powers of perception can give them no intelligence. All the various modes of delicate proportion, all the beautiful varieties of light and colours, whether exhibited in the works of nature or of art, are to them irretrievably loſt. Dependent for every thing, but mere ſubſiſtence, on the good offices of others; obnoxious to injury from every point, which they are neither capacitated to perceive, nor qualified to reſiſt; they are, during the preſent ſtate of being, rather priſoners at large, than citizens of nature. The ſedentary life, to which, by privation of ſight, they are deſtined, relaxes their frame, and ſubjects them to the whole tribe of diſagreeable ſenſations which ariſe from dejection of ſpirits. Hence the moſt feeble exertions create laſſitude and uneaſineſs. Hence the native tone of the nervous ſyſtem, which alone is compatible with health and pleaſure, being deſtroyed by inactivity, exaſperates and embitters every common difficulty in life. Natural evils, however, are always ſupportable; they not only ariſe

from undeſigning cauſes, but are either mild in their attacks, or ſhort in their duration: it is the miſeries which are inflicted by conſcious and reflecting agents alone, that can deſerve the name of evils. Theſe excruciate the ſoul with ineffable poignancy, as expreſſive of indifference or malignity in thoſe by whom ſuch bitter portions are cruelly adminiſtered. The negligence or wantonneſs, therefore, with which the blind are too frequently treated, is an enormity which God alone has benevolence to feel, or juſtice to puniſh.

Thoſe among the blind who have had ſenſibility to expreſs the effects of their misfortunes, have deſcribed them in terms capable of penetrating the moſt unfeeling heart. Homer, the venerable father of epic poetry, who, in the perſon of Demodocus, the Phæatian bard, is ſaid to have deſcribed his own ſituation, proceeds thus:

Τον περι Μεσ' επιλησε, διδε δ' αγαθον τε, κακον τε
Οφθαλμων μεν αμερσε, διδε δ' ηδειαν αοιδην. ODYS. θ.

Dear to the muſe, who gave his days to flow
With mighty bleſſings, mix'd with mighty woe,
In clouds and darkneſs quench'd his viſual ray,
Yet gave him pow'r to raiſe the lofty lay. *Pope.*

Milton, in his addreſs to light, laments the misfortune of his being blind in the following paſſage:

Thus with the year
Seaſons return; but not to me returns
Day, or the ſweet approach of ev'n or morn,
Or light of vernal bloom, or ſummer's roſe,
Or flocks, or herds, or human face divine;
But cloud inſtead, and ever-during dark,
Surrounds me, from the cheerful ways of men
Cut off, and for the book of knowledge fair
Preſented with an univerſal blank,
Of nature's works to me expung'd and ras'd,
And wiſdom at one entrance quite ſhut out. *Par. Loſt*, b. iii.

The ſame inimitable author, in his tragedy of Sampſon Agoniſtes, deplores the misfortunes of blindneſs with a pathos and energy ſufficient to excite compaſſion in the moſt obdurate bread:

O loſs of ſight, of thee I moſt complain!
Blind among enemies, O worſe than chains,
Dungeon, or beggary, decrepid age.
Light, the prime work of God, to me's extinct,
And all her various objects of delight
Annull'd, which might in part my grief have eas'd,
Inferior to the vileſt now become
Of man or worm. The vileſt here excel me:
They creep, yet ſee; I dark in light expos'd
To daily fraud, contempt, abuſe, and wrong,
Within doors, or without, ſtill as a fool,
In power of others, never in my own;
Scarce half I ſeem to live, dead more than half.
O dark, dark, dark, amid the blaze of noon,
Irrecoverably dark, total eclipſe
Without all hope of day!
O firſt created Beam, and thou great Word,
Let there be light, and light was over all;
Why am I thus bereav'd thy prime decree?

Oſſian,

Oſſian, who in his old age participated the ſame calamity, has, in more than one paſſage of his works, deſcribed his ſituation in a manner ſo delicate, yet ſo pathetic, that it awakens the fineſt feelings of the heart:

"O thou that rolleſt above, round as the ſhield of my fathers! whence are thy beams, O ſun! whence thy everlaſting light? Thou comeſt forth in thy awful beauty, and the ſtars hide themſelves in the ſky; the moon, cold and pale, ſinks in the weſtern wave. But thou thyſelf moveſt alone: who can be a companion of thy courſe? The oaks of the mountains fall; the mountains themſelves decay with years; the ocean ſhrinks and grows again; the moon herſelf is loſt in heaven: but thou art for ever the ſame; rejoicing in the brightneſs of thy courſe. When the world is dark with tempeſts; when thunder rolls and lightning glances through the heavens; thou lookeſt in thy beauty from the clouds, and laugheſt at the ſtorm. But to Oſſian thou lookeſt in vain: for he beholds thy beams no more; whether thy yellow hair flows on the eaſtern clouds, or thou trembleſt at the gates of the weſt. But thou art, perhaps, like me for a ſeaſon; and thy years will have an end: thou ſhalt ſleep in thy clouds, careleſs of the voice of the morning. Exult then, O ſun, in the ſtrength of thy youth! age is dark and unlovely; it is like the glimmering light of the moon, when it ſhines through broken clouds, and the miſt is on the hills, the howling blaſt of the north is on the plain, the traveller ſhrinks in the midſt of his journey."

Thus dependent on every creature, and paſſive to every accident on earth, can the uncharitable world be ſurpriſed to obſerve moments when the *blind* are at variance with themſelves and every thing elſe around them? With the ſame inſtincts of ſelf-preſervation, the ſame iraſcible paſſions which are common to the ſpecies, and exaſperated by a ſenſe of inability either for retaliation or defence; can the blind be real objects of reſentment or contempt, even when they ſeem peeviſh or vindictive? This, however, is not always their character. Their behaviour is often highly expreſſive, not only of reſignation, but even of cheerfulneſs; and though they are often coldly, and even inhumanly, treated by men, yet are they rarely, if ever, forſaken of heaven. The common Parent of nature, whoſe benignity is permanent as his exiſtence, and boundleſs as his empire, has neither left his afflicted creatures without conſolation or reſource. Even from their loſs, however oppreſſive and irretrievable, they derive advantages; not, indeed, adequate to recompenſe, but, in ſome degree, ſufficient to alleviate, their miſery. The attention of the ſoul, confined to theſe avenues of perception which ſhe can command, is neither diſſipated nor confounded by the immenſe multiplicity, nor the rapid ſucceſſion, of ſurrounding objects. Hence her contemplations are more uniformly fixed upon herſelf, and the revolutions of her own internal frame. Hence her perceptions of ſuch external things as are contiguous and obvious to her obſervation, become more lively and exquiſite. Hence even her inſtruments of corporeal ſenſation are more aſſiduouſly cultivated and improved, ſo that from them ſhe derives ſuch notices and preſages of approaching pleaſure or impending danger, as entirely eſcape the attention of thoſe who depend for ſecurity on the reports of their eyes. A blind man, when walking ſwiftly, or running, is kindly and effectually checked by nature from rudely encountering ſuch hard and extended objects as might hurt or bruiſe him. When he approaches bodies of this kind, he feels the

atmosphere more sensibly resist his progress; and, in proportion as his motion is accelerated, or his distance from the object diminished, the resistance is increased. He distinguishes the approach of his friend from far by the sound of his steps, by his manner of breathing, and almost by every audible token which he can exhibit. Prepared for the dangers which he may encounter from the surface of the ground upon which he walks, his step is habitually firm and cautious. Hence he not only avoids those falls which might be occasioned by its less formidable inequalities, but, from its general bias, he collects some ideas how far his safety is immediately concerned; and, though these conjectures may be sometimes fallacious, yet they are generally so true, as to preserve him from such accidents as are not incurred by his own temerity. The rapid torrent, and the deep cascade, not only warn him to keep a proper distance, but inform him in what direction he moves, and are a kind of audible synosures to regulate his course. In places to which he has been accustomed, he as it were recognises his latitude and longitude from every breath of varied fragrance that tinges the gale, from every ascent or declivity in the road, from every natural or artificial sound that strikes his ear; if these indications be stationary, and confined to particular places. Regulated by these signs, the *blind* have not only been known to perform long journeys themselves, but to conduct others through dangerous paths at the dark and silent hour of midnight, with the utmost security and exactness. We are told by Casaubon and Leo Africanus, of a very extraordinary blind guide, who used to conduct the merchants through the sands and deserts of Arabia; and in our own country we have a very remarkable instance of a blind guide in John Metcalf, of Manchester, who very lately followed the occupation of conducting strangers through intricate roads during the night, or when the tracks were covered with snow. And, strange as this may appear to those who can see, the employment of this man was afterwards that of a projector and surveyor of highways in difficult and mountainous parts. With the assistance only of a long staff, he has been several times seen traversing the roads, ascending precipices, exploring valleys, and investigating their several extents, forms, and situations, so as to answer his designs in the best manner. Most of the roads over the Peak in Derbyshire have been altered by his directions; particularly those in the vicinity of Buxton: and he has since constructed a new one betwixt Wilmslow and Congleton, with a view to open a communication to the great London road without being obliged to pass over the mountains. See the account by Dr. Bew, published in the Transactions of the Manchester Society.

It were endless to mention the various mechanical operations of which the blind are capable, by their nicety and accuracy of touch. In some, the tactile powers are said to have been so highly improved, as to perceive that texture and disposition of coloured surfaces by which some rays of light are reflected and others absorbed, and in this manner to distinguish colours. The testimonies, however, for this fact, appear too vague and general to deserve public credit. But that their acoustic perceptions are distinct and accurate, we may fairly conclude from the rapidity with which they ascertain the acuteness or gravity of different tones, as relative one to another; and from their exact discernment of the various kinds and modifications of sound, and of sonorous objects, if the sounds themselves be in any degree significant

significant of their causes. From this accuracy of external sensation, and from the assiduous applications of a comprehensive and attentive mind, we are able to account for the rapid and astonishing progress which some of them have made in those departments of literature, which were most obvious to their senses and accessible to their understandings. What, for instance, can be more remote from the conceptions of a blind man than the abstract relations and properties of space and quantity? yet the incomprehensible attainments of Doctor Saunderson, of Cambridge, in all the branches of mathematics, are now fully known by the literary world, both from the testimony of his pupils, and the publication of his works. But, should the fact be still uncertain, it might be sufficiently verified by a living instance, in the person of Doctor Moyes, of Manchester, who, though blind from his infancy, by the ardour and assiduity of his application, and by the force of natural genius, has not only made great advances in mechanical operations, in music, and in the languages; but is likewise skilled in geometry, in optics, in algebra, in astronomy, in chemistry, and in most other branches of natural philosophy. His example alone is abundantly sufficient to do away the vulgar prejudice, which presumes to think blindness and learning incompatible; and that the cultivation of the talents of blind persons is a weary and unpromising task.

Many attempts have been made to investigate, both from reason *à priori*, and from experiment, what might be the primary effects of light and luminous objects upon such as have been born blind, or early deprived of sight, if at a maturer period they should instantaneously recover their visual powers. But upon this topic there is much reason to fear, that nothing satisfactory has yet been discovered. The fallacy of hypothesis and conjecture, when formed *à priori* with respect to any organ of corporeal sensation and its proper object, is too obvious to demand illustration. But from the nature of the eye, and the mediums of its perception, to attempt an investigation of the various and multiform phenomena of vision, would be a most romantic undertaking. Even the discoveries which are said to accrue from experiment, may be held as extremely doubtful and precarious; because in these experiments it does not appear to have been ascertained, that the organs to which visible objects were presented immediately after chirurgical operations, could be in a proper state to perceive them. Yet, after all, it is extremely probable, that figure, distance, and magnitude, are not immediate objects of ocular sensation, but acquired and adjusted by long and reiterated experience. The gentleman couched by Mr. Cheselden had no idea of distance; but thought that all the objects he saw touched his eyes, as what he felt did his skin. It was also a considerable time before he could remember which was the cat, and which the dog, without feeling them. There are many desiderata, which the perceptions of a man born blind might considerably illustrate, if his instruments of vision were in a right state, and assisted by a proper medium. Such a person might perhaps give a clearer account, why objects, whose pictures are inverted upon the retina of the eye, should appear to the mind in their real positions; or why, though each particular object is painted upon the retina of both our eyes, it should only be perceived as single. Perhaps, too, this new spectator of visible nature might equally amuse our curiosity and improve our theory, by attempting

tempting to deſcribe his earlieſt ſenſations of colour, and its original effects upon his organ and his fancy. It is far from being certain, however, that trials of this kind have ever been fairly made. For a more minute detail of theſe points, the reader may conſult M. Diderot's Letire ſur les Aveugles, à l'uſage de ceux qui voyent; alſo Mr. Cheſelden's Anatomy, and Locke's Eſſay on the Human Underſtanding.

When we reflect on the numberleſs advantages derived from the uſe of ſight, and its immenſe importance in extending the human capacity, we might be tempted to doubt the fidelity of thoſe reports concerning ſuch perſons as, without the aſſiſtance of light, have arrived at high degrees of eminence even in thoſe ſciences which appear abſolutely unattainable but by the interpoſition of external mediums. It has, however, been demonſtrated by Dr. Reid, in his Inquiry into the Human Mind, that blind men, by proper inſtructions, are ſuſceptible almoſt of every idea and of every truth which can be impreſſed on the mind by the mediation of light and colours, except the ſenſations of light and colours themſelves. Yet there is one phenomenon of this kind which ſeems to have eſcaped the attention of that great philoſopher, and of which no author has hitherto been able to offer any tolerable ſolution. Although we ſhould admit, that the blind can underſtand with great perſpicacity all the phenomena of light and colours; though it were allowed, that in theſe ſubjects they might extend their ſpeculations beyond their inſtructions, and inveſtigate the mechanical principles of optics by the mere force of genius and application, from the data which they had already obtained; yet it will be difficult, if not impoſſible, to aſſign any reaſon why theſe objects ſhould be more intereſting to a blind man than any other abſtract truths whatever. It is poſſible for the blind, by a retentive memory, to tell you, That the ſky is an azure; that the ſun, moon, and ſtars, are bright; that the roſe is red, the lily white or yellow, and the tulip variegated. By continually hearing theſe ſubſtantives and adjectives joined, he may be mechanically taught to join them in the ſame manner: but, as he never had any ſenſation of colour, however accurately he may ſpeak of coloured objects, his language muſt be like that of a parrot; without meaning, or without ideas. Homer, Milton, and Oſſian, had been long acquainted with the viſible world before they became blind, and might ſtill retain the warm and pleaſing impreſſions of what they had ſeen. Their deſcriptions might be animated with all the rapture and enthuſiaſm which originally fired their boſoms when the grand or delightful objects which they delineated were immediately beheld. Nay, that enthuſiaſm might ſtill be heightened by a ſtriking ſenſe of their loſs, and by that regret which a ſituation ſo diſmal might naturally inſpire. But how ſhall we account for the ſame energy, the ſame tranſport of deſcription, exhibited by thoſe on whoſe minds viſible objects were either never impreſſed, or have been entirely obliterated? Yet, as unaccountable as this fact may appear, it is no leſs certain than extraordinary. We mention it as one amongſt the few reſources for entertainment, and avenues to reputation, which are ſtill reſerved for the blind; and, if an example be wanting to enforce the remark, we need only refer to the ingenious Dr. Blacklock.

With

With respect to the education of the blind, it is impossible to enter into minute particulars. These must be determined by the genius, the capacity, and the circumstances, of those to whom the general rules which may be given should be applied. It will easily occur to the reader, that, if the pupil should not be placed in easy circumstances, music is his readiest and most probable resource. Civil and and ecclesiastical employments have either something in their own nature, or in the invincible prejudices of mankind, which renders them almost entirely inaccessible to those who have lost the use of sight. No liberal and cultivated mind however can entertain the least hesitation in concluding, that there is nothing, either in the nature of things, or even in the positive institutions of genuine religion, repugnant to the idea of a blind clergyman. But the novelty of the phenomenon probably has hitherto prevented its being put in practice, though in itself so evidently suitable. Dr. Nicholas Bacon, a descendant of the celebrated Lord Verulam, who, in the city of Brussels, was created doctor of laws, was deprived of sight at nine years of age by an arrow from a cross-bow. Yet, notwithstanding this accident, he pursued the same plan of education in which he had been engaged; and having heard that one Nicasius de Vourde, born blind, who lived towards the end of the fifteenth century, after having distinguished himself by his studies in the university of Louvain, took his degree as doctor of divinity in the university of Cologne, he resolved to make the same attempt. The professors were disposed to treat his plan with contempt, and admitted him into their schools, rather from an impression that it might amuse than become of any use to him. However, contrary to their expectations, he obtained the first places among his condisciples. It was then said, that such rapid advances might be made in the preliminary branches of his education; but would soon be effectually checked by studies of a more profound and abstracted nature. This, it seems, was repeated from school to school, through the whole climax of his pursuits; and when, in the course of academical learning, it became necessary to study poetry, it was the general voice that all was over, and that at length he had reached his *ne plus ultra*. But here he likewise foiled their prepossessions, and taught them the immense difference between blindness of body and blindness of soul. After continuing his studies for two years more, he applied himself to the law, took his degree in that science, commenced advocate in the council of Brabant, and had the pleasure of terminating almost every suit in which he was engaged to the satisfaction of his clients.

Had it not been for a fact so striking and so well authenticated, though there could have been no doubt that a blind man might discharge the office of a chamber counsel with success; yet, as a barrister, his difficulties must have appeared more formidable, if not absolutely insuperable. For he should remember all the sources, whether in natural equity or positive institutions, whether in common or statute law, from whence his argument ought to be drawn. He must be able to specify, and to arrange in their proper order, all the material objections of his antagonists: these he must likewise answer as they were proposed, *extempore*. When, therefore, it is considered how difficult it is to temper the natural association of memory with the artificial arrangements of judgment, the desultory flights of imagination with the calm and regular deductions of reason,

ſon, the energy and perturbation of paſſion with the coolneſs and tranquillity of deliberation; ſome idea may be formed of the arduous taſk which every blind man muſt achieve, who undertakes to purſue the law as a profeſſion. Perhaps aſſiſtances might be drawn from Cicero's Treatiſe on Topics and on Invention; which, if happily applied, might leſſen the diſparity of a blind man to others, but could ſcarcely place him on an equal footing with his brethren.

In ſpeaking of the learned profeſſions, we have, for obvious reaſons omitted phyſic, as unattainable to blind perſons. The moſt important view we can entertain in the education of a perſon deprived of ſight, is to redreſs as effectually as poſſible the natural diſadvantages with which he is encumbered; or, in other words, to enlarge as far as poſſible the ſphere of his knowledge and activity. This can only be done by the improvement of his intellectual, imaginative, or mechanical, powers; and which of theſe ought to be moſt aſſiduouſly cultivated, the genius of every individual alone can determine. From the original dawning, however, of reaſon and ſpirit, the parents and tutors of the blind ought to inculcate this maxim, That it is their indiſpenſible duty to excel, and that it is abſolutely in their power to attain a high degree of eminence. To impreſs this notion on their minds, the firſt objects preſented to their obſervation, and the firſt methods of improvement applied to their underſtanding, ought, with no great difficulty, to be comprehenſible by thoſe internal powers and external ſenſes which they poſſeſs. Not that improvement ſhould be rendered quite eaſy to them, if ſuch a plan were poſſible: for all difficulties, which are not really or apparently inſuperable, heighten the charms and enhance the value of thoſe acquiſitions which they ſeem to retard. But care ſhould be taken that theſe difficulties be not magnified or exaggerated by imagination; for, in fact, the blind have a painful ſenſe of their own incapacity, and conſequently a ſtrong propenſity to deſpair. For this reaſon, parents and relations ought never to be too ready in offering their aſſiſtance to the blind in any office which they can perform, or in any acquiſition which they can procure for themſelves, whether they are prompted by amuſement or neceſſity. If he has a mechanical turn, let him not be denied the uſe of edge-tools; for it is better that he ſhould loſe a little blood, or even break a bone, than be perpetually confined to the ſame place, debilitated in his frame, and depreſſed in his mind. Such a being can have no employment but to feel his own weakneſs, and become his own tormentor; or to transfer to others all the malignity and peeviſhneſs ariſing from the natural, adventitious, or imaginary, evils which he feels. Scars, fractures, and diſlocations, are trivial misfortunes compared with imbecility, timidity, or fretfulneſs of mind. Theſe impreſſions, which, even in his moſt improved ſtate, will be too deeply felt by every blind man, are redoubled by that utter incapacity of action which muſt reſult from the officious humanity of thoſe who would anticipate or ſupply all his wants, who would prevent all his motions, who would do or procure every thing for him without his own endeavours. It is poſſible they may ſurvive thoſe who, by the ties of blood and nature, are more immediately intereſted in their happineſs than the reſt of mankind; and, when this happens, their diſappointments may be many; their petitions will often be refuſed, ſeldom fully gratified; and, even when granted, the conceſſion will be ſo ungraceful as to render its want

want much more tolerable than its fruition. For all these reafons, in the education of a blind man, it is infinitely better to direct than superfede his own exertions. From the time that he can move and feel, let him be taught to supply his own exigencies; to drefs and feed himfelf; to run from place to place, either for exercife, or in purfuit of what he wants. In thefe excurfions, however, it will be highly proper for fome one to fuperintend his motions at a diftance, without feeming to watch over him. A vigilance too apparent, may imprefs him with a fufpicion as to the true motive. When dangers are obvious, fuch as rivers, precipices, &c. thofe who are entrufted with the blind will find it neither neceffary nor expedient to make their vigilance a fecret. They ought then to acquaint their pupil, that they are prefent with him; and so in erpofe for his prefervation. But objects lefs dangerous, which may give him pain without any permanent injury, may with defign be thrown in his way; for his own experience of thefe bad effects will be an infinitely more eloquent monitor than the counfels of any advifer whatever.

At proper intervals exercife will be found highly requifite, rather to preferve health, and facilitate the vital functions, than merely for recreation. Of all the different kinds of exercife, riding on horfeback is far the moft productive of its end. In thefe excurfions his attendant ought conftantly to be with him; and the horfe fhould always either be taught to follow its guide, or be conducted by a leading-rein, befides the bridle which he himfelf holds. The prefent Lord Deerhurft, though he loft his fight by falling from his horfe in attempting to leap a gate, yet ftill prefers the active exercife of riding on horfeback to lounging in a carriage. He is frequently feen riding very fwift through the crowd in the vicinity of London, conducted by his fervant with a leading-rein.

There are few fciences in which the blind have not occafionally diftinguifhed themfelves: even thofe whofe acquifition feemed effentially to depend upon vifion, have at laft yielded to genius and induftry, though deprived of that advantage. Dr. Saunderfon has left behind him the moft ftriking evidences of aftonifhing proficiency in thofe retired and abftract branches of mathematics which appeared leaft acceffible to perfons of his infirmity. Sculpture is not, perhaps, the moft practicable of the arts for a blind man; yet he is not wholly excluded from that pleafing employment. There are inftances of perfons who have been enabled to take the figure and idea of a face by the touch, and mould it in wax with the utmoft exactnefs; as was the cafe of the blind fculptor mentioned by de Piles, who thus took the likenefs of the Duke de Bracciano in a dark cellar, and made a marble ftatue of Charles I. with great elegance and juftnefs. However unaccountable it may appear to the abftract philofopher, yet nothing is more certain in fact, than that a blind man may alfo, by the efforts of a cultivated genius, exhibit in poetry the moft natural images and animated defcriptions, even of vifible objects, without incurring the imputation of plagiarifm.

In the fifter art of mufic, there are many aftonifhing proofs, how far the blind may proceed. If we look into former periods, we fhall find them pregnant with examples, how amply nature has capacitated the blind to excel both in the fcientific and practical departments of mufic. In the fixteenth century, when the progrefs of improvement both in melody and harmony was rapid and con-

ſpicuous, Franciſcus Salinas was eminently diſtinguiſhed. Though afflicted with incurable blindneſs, he was profoundly ſkilled both in the theory and practice of muſic. As a performer, he is celebrated by his cotemporaries with the higheſt encomiums. As a theoriſt, his book, if we may believe Sir John Hawkins, is equal in value to any now extant in any language. Though this unfortunate perſon was deprived of ſight in his earlieſt infancy, he did not content himſelf with delineating the various phenomena in muſic, but the principles from whence they reſult, the relations of ſound, the nature of arithmetical, geometrical, and harmonical, ratios, which then were eſteemed eſſential to the theory of muſic, with a degree of intelligence which would have deſerved admiration though he had been in full poſſeſſion of every ſenſe requiſite for theſe diſquiſitions. In the ſame period flouriſhed Caſpar Crumbhorn, blind from the third year of his age: yet he compoſed ſeveral pieces in many parts with ſo much ſucceſs, and performed both upon the flute and violin ſo exquiſitely, that he was diſtinguiſhed by Auguſtus elector of Saxony. To theſe might be added Martini Peſenti of Venice, a compoſer of vocal and inſtrumental muſic almoſt of all kinds, though blind from his nativity; with other examples equally worthy of public attention.

That arithmetical and algebraical calculations ſhould be expeditiouſly performed by the blind, ſeems on the firſt view an utter impoſſibility; yet it is ſurpriſing to find what proficiency has been made herein, particularly by Dr. Saunderſon and Dr. Moyes, whoſe methods are extremely ingenious and comprehenſive. M. Diderot, in his Letters concerning the blind, has explained Dr. Saunderſon's numerical table in the moſt circumſtantial manner; we ſhall therefore give the deſcription in his words. "Imagine to yourſelf a ſquare, divided into four equal parts by perpendicular lines at the ſides, in ſuch a manner, that it may preſent you the nine points, 1, 2, 3, 4, 5, 6, 7, 8, 9. Suppoſe this ſquare pierced with nine holes capable of receiving pins of two kinds, all of equal length and thickneſs, but ſome with heads a little larger than the others. The pins with the large heads are never placed any where elſe but in the centre of each ſquare; and thoſe with the ſmaller heads are never placed any where but at the ſides, except in one ſingle caſe, which is that of making the figure 1, where none are placed at the ſides. The ſign of 0 is made by placing a pin with a large head in the centre of the little ſquare, without putting any other pin at the ſides. The number 1 is repreſented by a pin with a ſmall head placed in the centre of the ſquare, without putting any other pin at the ſides: the number 2, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 1: the number 3, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 2: the number 4, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 3: the number 5, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 4: the number 6, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 5: the number 7, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of

of the fides at the point 6: the number 8, by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 7: the number 9, by a pin with a large head placed in the centre of the fquare, and by a pin with a fmall head placed on one of the fides at the point 8. Here are plainly ten different expreffions obvious to the touch, of which every one anfwers to one of our ten arithmetical characters. Imagine now a table as large as you pleafe, divided into fmall fquares, horizontally ranged, and feparated one from the other at fimilar diftances. Thus you will have the inftrument of Saunderfon. You may eafily conceive that there is not any number which one cannot exprefs upon this table; and, by confequence, no arithmetical operation which one cannot execute upon it. Let it be propofed, for inftance, to find the fum, or to work the addition, of the nine numbers following:

1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8
5	6	7	8	9
6	7	8	9	0
7	8	9	0	1
8	9	0	1	2
9	0	1	2	3

"I exprefs them on the table in the order as they are dictated to me: the firft figure at the left of the firft number, upon the firft fquare to the left of the firft line; the fecond figure, to the left of the firft number, upon the fecond fquare to the left of the fame line; and fo of the reft. I place the fecond number upon the fecond row of fquares, units beneath units, and tens beneath tens, &c. I place the third number upon the third row of fquares, and fo of the reft. Then with my fingers running over each of the rows vertically from the bottom to the top, beginning with that which is neareft to my right, I work the addition of the numbers which are expreffed, and mark the furplus of the tens at the foot of that column. I then pafs to the fecond column, advancing towards the left: upon which I operate in the fame manner; from thence to the third; and thus in fucceffion I finifh my addition.

"We may fee how the fame table ferved him for demonftrating the properties of rectilineal figures. Let us fuppofe this propofition to be demonftrated, That parallelograms which have the fame bafis and the fame height are equal in their furfaces. He placed his pins accordingly, and gave names to the angular points, and finifhed his demonftration with his fingers. If we fuppofe that Saunderfon only employed pins with large heads to mark the limits of his figures, around thefe he might arrange his pins with fmall heads in nine different manners, all of which were familiar to him. Thus he fcarcely found any embarraffment but in thofe cafes where the great number of angular points which he was under a neceffity of naming in his demonftration obliged him to recur to the letters of the alphabet. We are not informed how he employed them. We only know, that his fingers ran over the board with aftonifhing agility; that he undertook with fuccefs the longeft calculations; that he could interrupt the feries, and difcover his miftakes; that he proved them with the

greatest ease; and that his labours required infinitely less time than one could have imagined, by the exactness and promptitude with which he prepared his instruments and disposed his table.

"This preparation consisted in placing pins with large heads in the centres of all the squares: having done this, no more remained to him but to fix their values by pins of smaller heads, except in cases where it was necessary to mark an unit; then he placed in the centre of a square a pin with a small head, in the place of a pin with a large head with which it had been occupied. Sometimes, instead of forming an entire line with these pins, he contented himself with placing some of them at all the angular points, or points of intersection; around which he tied silk threads, which finished the formation of the limits of his figures." It may be added by way of improvement, that for the division of one series of numbers from another, a thin piece of timber in the form of a ruler with which lines are drawn, having a pin at each end for the holes in the squares, might be interposed between the two series to be distinguished.

By the notation here exhibited every modification of numbers may be expressed, and of consequence every arithmetical operation successfully performed; but we shall now describe another form of palpable arithmetic, equally comprehensive and much more simple than that of Saunderson, the invention of Dr. Moyes. He speaks of it in the following terms:

"The following palpable notation I have generally used for these twenty years to assist my memory in numerical computations. When I began to study the principles of arithmetic, which I did at an early period of life, I soon discovered, to my mortification, that a person entirely deprived of sight could scarcely proceed in that useful science without the aid of palpable symbols representing the ten numerical characters. Being at that time unacquainted with the writings of Saunderson, in which a palpable notation is described, I embraced the obvious, though, as I afterwards found, imperfect, expedient of cutting into the form of the numerical characters thin pieces of wood or metal. By arranging these on the surface of a board, I could readily represent any given number, not only to the touch, but also to the eye; and, by covering the board with a lamina of wax, my symbols were prevented from changing their places, they adhering to the board from the slightest pressure. By this contrivance, I could solve, though slowly, any problem in the science of numbers: but it soon occurred to me, that my notation, consisting of ten species of symbols or characters, was much more complicated than was absolutely necessary, and that any given number might be distinctly expressed by three species of pegs alone. To illustrate my meaning, imagine a square piece of mahogany a foot broad, and an inch in thickness; let the sides be each divided into twenty-four equal parts; let every two opposite divisions be joined by a groove cut in the board sufficiently deep to be felt with the finger, and let the board be perforated at each intersection with an instrument a tenth of an inch in diameter. The surface of the board being thus divided into 576 little squares, with a small perforation at each of their angles, let three sets of pegs or pins be so fitted to the holes in the board, that when struck into them they may keep their positions like those of a fiddle, and require some force to turn them round. The head of each peg belonging to the first

first set is a right-angled triangle about one-tenth of an inch in thickness; the head of each peg belonging to the second set differs only from the former in having a small notch in its sloping side or hypothenuse; and the head of each peg belonging to the third set is a square of which the breadth should be equal to the base of the triangle of the other two. These pegs should be kept in a case consisting of three boxes or cells, each cell being allotted to a set, and the case must be placed close by the board previous to the commencement of every operation. Each set should consist of sixty or seventy pegs (at least when employed in long calculations); and, when the work is finished, they should be collected from the board, and carefully restored to their respective boxes.

"Things being thus prepared, let a peg of the first set be fixed into the board, and it will acquire four different values according to its position respecting the calculator. When its sloping side is turned towards the left, it denotes one, or the first digit; when turned upwards, or from the calculator, it denotes two, or the second digit; when turned to the right, it represents three; and when turned downwards, or towards the calculator, it denotes four, or the fourth digit. Five is denoted by a peg of the second set, having its sloping side or hypothenuse turned to the left; six, by the same turned upwards; seven, by the same turned to the right; and eight, by the same turned directly down, or towards the body of the calculator. Nine is expressed by a peg of the third set when its edges are directed to right and left; and the same peg expresses the cypher when its edges are directed up and down. By three different pegs the relative values of the ten digits may therefore be distinctly expressed with facility; and by a sufficient number of each set the steps and result of the longest calculation may be clearly represented to the sense of feeling. It seems unnecessary to illustrate this by an example; suffice it to express in our characters, the present year of the Christian æra 1798:—Take a peg of the first set, and fix it the board with its sloping side turned towards the left, equal to one; take now a peg of the second set, and fix it in the next hole in the same groove, proceeding as usual from left to right, with its sloping side turned to the right, equal to 7; next take a peg of the third set, and fix it the third hole, with its edges directed to right and left, denoting 9; lastly, take a peg of the second set, and place it in the next hole, with its sloping side turned downwards, equal to 8; and the whole will express the number required.

"When it is necessary to express a vulgar fraction, I place the numerator in the groove immediately above, and the denominator in that immediately below, the groove in which the integers stand; and in decimal arithmetic an empty hole in the integer groove represents the comma or decimal point. By similar breaks I also denote pounds, shillings, pence, &c. and by the same expedient I separate in division the divisor and quotient from the dividend. This notation, which supplies me completely with coefficients and indices in algebra and fluxions, seems much superior to any of the kind hitherto made public in the west of Europe. That invented and described by Mr. Grenville, having no less than ten sets of pegs, is by much too complicated for general practice; and that which we owe to the celebrated Saunderson is apt to puzzle and embarrass the calculator, as the pegs representing the numerical digits can seldom or never be in the same straight line."

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In the higher parts of mathematics, ſuch as conic ſections, the ſame ſolid figures which are mediums of perception to thoſe who ſee, may perform the ſame uſeful office to the blind. But, for the ſtructure of ſuperficial figures, we ſhould imagine, that a kind of matter might be found, ſoft enough to be eaſily ſuſceptible of impreſſions, yet hard enough to retain them till effaced by an equal preſſure. Suppoſe, for inſtance, a table were formed, four feet broad and eight in length; for the figures, that they may be the more ſenſible to the touch, ought to be larger than ordinary. Suppoſe this table had brims or a moulding round it, riſing an inch above the ſurface: let the whole expanſe, then, be filled with bees-wax, and the ſurface above preſſed extremely even with a poliſhed board, formed exactly to fit the ſpace within the mouldings. This board will always be neceſſary to efface the figures employed in former propoſitions, and prepare the ſurface for new ones. We think we have imagined the minuteſt inconvenience that can ariſe from this method of delineating and conceiving geometrical truths; and, after all, the table appears to us the beſt and the leaſt troubleſome apparatus which a blind man can uſe. We can ſee no reaſon why general ideas of geography or topography might not be conveyed to him in the ſame manner, by ſpheres compoſed of or covered with the ſame impreſſible matter.

But although the extenſive view we have taken of this ſubject has led us to notice the different inventions for the improvement of the blind, which have had their origin in our own country, we ſhould by no means omit a plan publiſhed at Paris under the title of An Eſſay on the Education of the Blind, which ſuperſedes every former attempt to facilitate their improvement. The invention of a plan ſo arduous in its appearance, and ſo practicable in its execution, demanded the higheſt exertions of the nobleſt genius to produce it, and the moſt ſtrenuous efforts of indefatigable humanity to render it effectual. Its object is to teach them, by palpable characters impreſſed on paper, not only the liberal arts and ſciences, but likewiſe the principles of mechanical operation, in ſuch a manner, that thoſe who have no genius for literary improvement may yet become reſpectable, uſeful, and independent, members of ſociety, in the capacity of common artiſans. By theſe tangible ſignatures they are taught to read, to write, and to print; they are likewiſe inſtructed in geometry, in algebra, geography, and, in ſhort, in every branch of natural philoſophy. Nor are their efforts circumſcribed by mere utility; a taſte for the fine arts has likewiſe been cultivated among them. They have been taught to read muſic with their fingers as others do with their eyes; and, though they cannot at once feel the notes and perform them upon an inſtrument, yet they are capable of acquiring any leſſon with as much exactneſs and rapidity as thoſe who enjoy all the advantages of ſight. In his firſt chapter the author diſcovers the end propoſed by that delineation of culture which he offers to the blind; it is to enlarge their ſphere of knowledge, and of conſequence to increaſe their capacities and improve their powers of action, ſo that they may become happy and independent in themſelves, and uſeful and agreeable to others. The ſecond chapter contains an anſwer to the objections urged againſt the general utility of this inſtitution. Theſe objections are candidly ſtated, and anſwered in the moſt ſatisfactory manner. The third chapter treats of reading

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as adapted to the practice of the blind. The fourth confifts of anfwers to various objections againft the method of reading propofed for the blind. In the fifth is fhown the art of printing as practifed by the blind for their peculiar ufe. In the fixth is defcribed the manner of teaching the blind the art of printing for thofe that fee. In the feventh is reprefented the manner of teaching the blind to write. The eighth explains the method of teaching the blind arithmetic; the ninth, geography; the tenth, mufic. The eleventh contains an account of the mechanic arts in which the blind are employed, and of the way by which they are formed for fuch occupations. The twelfth fhows in general the proper manner of inftructing the blind, and draws a parallel between their education and that of the deaf and dumb. The thirteenth treats of the method of inftructing them in the languages, mathematics, hiftory, &c. What remains of the book is taken up with notes which illuftrate each particular chapter; a fhort hiftorical account of the rife, the progrefs, and the prefent ftate, of the academy for the formation of the blind; an ode on the cultivation of the blind, by one that laboured under that affliction; an extract from the regifter of the royal academy of fciences; opinion of the printers; models of the various pieces which blind children are capable of printing; and an account of the exercifes performed by blind children during the Chriftmas folemnities in 1786.

Having thus given a curfory view of the various topics contained the Effay, we proceed to give fome account of the manner in which the blind print and write. The blind compofitor has a box for every alphabetical character in ufe; on the outfide of thefe boxes are palpably marked the peculiar character belonging to each; they are filled with types, which he choofes and fets as they are called for, but not in the pofition in which they are to be read; on the contrary, they are inverted as objects are feen painted on the retina of an eye by an optician. Having thus fixed and arranged his types, he choofes a page of the ftrongeft paper that can be found, which he gently moiftens in a degree fufficient to render it more eafily fufceptible of impreffions, without being dilacerated or worn by the fhock which it muft afterwards undergo. He then lays it upon the types; and by the cautious operation of the prefs, or by the eafy ftrokes of a little hammer, which are frequently repeated over the whole expanfe, he caufes the impreffion of the type to rife on the oppofite fide of the paper, where, when dry, it continues not only obvious to the fight but the touch, and is far from being eafily effaced. On the upper fide of the paper the letters appear in their proper pofition, and by their fenfible elevation above the common furface render it practicable for the blind to read them with their fingers. Their manner of writing is analogous to this operation: the pupil, by repeated experiments, having familiarifed himfelf to the forms of the letters, both in their inverted and in their proper pofition, gradually learns to delineate them upon paper, moiftened as before, with the point of an iron pen, which has no fplit, and which is juft fharp enough to imprefs without piercing the paper: thus, on the fide next to the writer's hand, the letters are formed funk and inverted; but when the paper is turned they appear right and *in relievo*. Thus the blind are enabled to form and decypher, not only the characters required in common language, but alfo mathematical diagrams,

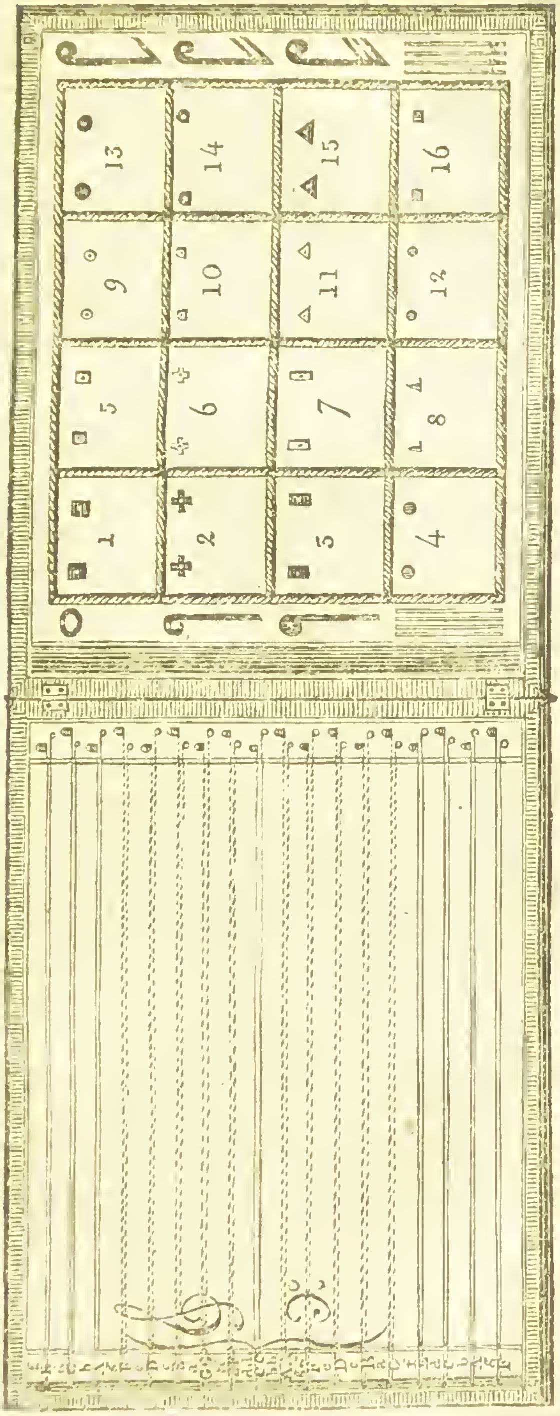
 arithmetical

arithmetical and geographical proceſſes, and all the characters uſed in the written language of muſic. That theſe are not idle pretences, or intended to impoſe on the credulous, many undeniable facts might be adduced to prove. And in fact, the blind themſelves are made to exhibit at their own academy every Wedneſday and Saturday to crowds of charitable admirers, by whoſe liberal donations the inſtitution is now chiefly ſupported.

There is little doubt but that the blind are capable of being taught aſtronomy, natural and moral philoſophy, theology, grammar, logic, hiſtory, and the belles lettres; but above all muſic, which is, perhaps, of all other ſciences, the moſt attainable, the moſt practicable, and the moſt conſolatory to the mind. If the pupil, however, be not endowed with natural talents for the latter, ſuffer him by no means to be initiated in it. If his natural genius favours the attempt, the harpſichord, harp, or organ, are the moſt proper inſtruments for him to begin with; becauſe by theſe inſtruments he may be made more eaſily acquainted with the extent of muſical ſcales, with the powers of harmony, with the relations of which it is conſtituted, and of courſe with the theory of his art. It would be not only unneceſſary, but impracticable, to carry him deep into the theory, before he has attained ſome facility in the practice. Let, therefore, his head and his hands (if we may uſe the expreſſion) be taught to go *pari paſſu*. Let the one be inſtructed in the ſimpleſt elements, and the others conducted in the eaſieſt operations firſt: contemplation and exerciſe will produce light in the one, and promptitude in the other. But, as his capacity of ſpeculation and powers of action become more and more mature, diſcoveries more abſtract and retired, taſks more arduous and difficult, may be aſſigned him. He ſhould be taught the names and gradations of the diatonic ſcale, the nature and uſe of time, the diverſity of its modes whether ſimple or mixed. He ſhould be taught the quantity or value of notes, not only with reſpect to their pitch, but to their duration. Yet, let him be inſtructed not to conſider theſe durations as abſolutely fixed, but variable according to the velocity of the movements in which they are placed. He ſhould never be habituated to take a piece of muſic either from the ſound of a voice or an inſtrument. His companion ought to read the muſic by the names and values of its characters, with the ſame exactneſs as the words in any other language. When he becomes a conſiderable adept in the art, tangible ſigns may be invented, by which he may not only be enabled to read, but even to ſet, muſic for himſelf. Such exerciſes will render him infinitely more accurate, both in his principles and practice, than he would otherwiſe be.

There is a hint of ſuch tangible ſigns given in Tanſure's Muſical Grammar; and Mr. Cheeſe has invented an inſtrument for teaching muſic to people deprived of ſight, after they have been ſufficiently inſtructed in its theoretical and practical principles. But the beſt contrivance of this kind at preſent known in England, ſeems to be an invention of Mr. Chriſtie, teacher at the aſylum for the blind in Liverpool, which he calls a *theograph*; an exact repreſentation of which is here delineated, and the following explanation of it has been tranſmitted to us by the inventor himſelf, and is as follows:

Plan



Plan of Mr. CHRISTIE's THEOGRAHP, for teaching MUSIC to the BLIND.

" The *theograph* is an inſtrument deſigned for initiating young pupils in the art of muſic, and to enable them not only to read, but, if they have a taſte for compoſition, to ſet their own muſic in tangible characters. In form it reſembles a muſic-book; and is to the blind what

what a book is to thofe who have fight. The firft fide confifts of a cufhion, on which the mufic is to be fet. It is divided by eighteen parallel lines, each line being reprefented by two brafs ftrings, between which the pin fhould pafs when a note is to be placed on a line, to prevent miftakes, which would frequently happen if the lines were fingle. Some of thefe lines are plain, others twifted. The four loweft, F A C E, are plain, and reprefent the ledger lines in the brafs. The next five, G B D F A, are twifted, and correfpond with the five lines or ftave in the bafs. The line above is plain, and denotes the middle, C, of the inftrument. The next five, E G B D F, are twifted, and anfwer to the five lines or ftave in the treble. The next three, A C E, are plain, and reprefent the ledger lines in alt. The fpace above is F, which completes the fcale, and provides a line or fpace for each key of the harpfichord, as appears by the letters on the margin. Additional keys may be provided for by changing the cliff. When the ftudent is become familiar with the fcale, he may proceed to acquire the names, properties, and feel, of the characters.—The fecond fide reprefents the cufhion, divided into fixteen fquares, in which are placed the characters: fix made of cork or leather; fix of card-paper, a little fmaller; and four pins headed with fealing-wax. The notes are reprefented by characters made of cork; the marks chiefly by wax-headed pins, and their combinations with corks; and the terms by the card-paper characters, and their combinations with wax-headed pins.

No. 1. are femibreves; 2. minims; 3. crotchets; 13. quavers; 14. femiquavers; 15. demi-femiquavers.

Marks. No. 16. The fquare wax-headed pin paffing through any one of the fix cork notes, fignifies a reft equal in time to the note on which it is placed. No. 4. A round wax-head placed in like manner, makes that note an appoggiatura. No. 8. A fharp wax-head fo placed, fignifies a fhake. No. 12. A circular flat wax-head placed in the fame manner, fignifies a paufe. No. 8. A fharp wax-head placed before a note, makes that note fharp. No. 12. A circular flat wax-head makes it flat. No. 4. A round wax-head makes it natural. A *direct*, is noted by No. 16, the fquare wax-head. No. 16, placed on No. 5, denotes the bafs cliff. On No. 6, the tenor ditto. On No. 7, the treble. A *tie*, is denoted by common pins placed in a femicircle. A pin after any note, ferves for a dot. A pin above a note, points out *ftaccato*. A pin under a note, *legato*. Two on each fide of a double bar fignify a repeat; and the repeat which is known by the letter S, is fignified by three pins placed one above another over the note on which it begins. Bars are denoted by wire ftaples, made fo as to embrace the ftave, as found in the lower part of the margins of this compartment or fide of the figure. No. 10 placed on any cork note, the pin paffing thro' both, fhews that the right-hand croffes into the bafs. No. 11 placed in like manner, fhews that the left-hand croffes into the treble.

Terms. No. 5, when placed above the ftave near the beginning, fignifies *grave*; No. 6, when placed in the fame fituation, fignifies *adagio*; No. 7, *largo*; No. 9, *vivace*; No. 10, *allegro*; No. 11, *prefto*. A pin placed before any of the laft fix characters implies *più*, or a little quicker; placed after, fignifies *poco*, or a little flower. No. 13, a wax flat head on No. 5, fignifies *forte*; on No. 6, *crefcendo*; on No. 7, *tutti*; on No. 9, *piano*; on No. 10, *diminuendo*; on No. 11, *folo*.

solo. A pin before *piano* makes it a little softer; and after, a little louder: before *forte*, a little louder; and after, a little softer. No. 4, a wax round head on No. 5, signifies *obligato*; on No. 6, *ripieno*; on No. 7, *harpeggio*; on No. 2, *da capo*; on No. 10, *tremando*; on No. 11, *calando*. No. 9, a wax sharp head on No. 5, signifies *symphony*; on No. 6, *song*; on No. 7, *moderato*; on No. 9, *da camera*; on No. 10, *da capello*; on No. 11, *da teatro*. Thus upwards of sixty of the most essential notes, marks, and terms, used in harpsichord music, are provided for; and, if more be wanted, they may readily be supplied by the student's own invention, as these are capable of a much more extensive combination. In organ music, the names of the stops, with all the various modes of expression, may be signified.

To enable the student to obtain a more general and comprehensive idea of musical notes, a set of semibreves, minims, crotches, &c. are made of tin, resembling in shape these characters as they appear in print, and are placed above the bars in the margins of the second side. The names, properties, and form, of each being accurately acquired, will not only enlarge his knowledge of the art, but render him more expert in communicating that knowledge to others, particularly to those who have sight. The portable size of this machine excludes the possibility of setting whole tunes thereon, the intention of it being only to enable the student to acquire a theoretical and practical knowledge of its principles, for which the compass of a few bars is sufficient. But, when as much music is set as the length of the stave will admit, the characters may be withdrawn, and replaced in their respective squares, ready to begin a new passage.

When the student has acquired a thorough knowledge of the principles of this machine, and is desirous to set movements at length, one or more frames may be provided with cushions, each a yard long, six inches broad, and one inch thick, having strings on both sides alike, so that when one side is full he may proceed on the other, covering the first side with a thin board; for which purpose the frames may be made to rise on each side a quarter of an inch above the cushions, and thus he will be enabled to retain his compositions till transcribed."

It is certain, that when playing concertos, or when performing in *score*, the blind must depend upon memory, and upon memory alone: but happily their retentive powers are remarkably strong; and there are few pieces of music which will be found either too intricate to be acquired, or too long to be remembered, by a person deprived of sight. Mr. Stanley, the celebrated blind leader of his majesty's band, and organist of St. Andrew's Holborn, performed what is still more astonishing; for it is said, he accompanied any lesson with a thorough bass, though he never had heard it before. When the pupil becomes a more profound theorist, if he has adopted the notion that music and geometry are congenial and inseparable, he may have read to him Malcolm's Essay on Music, and Treydell's Theory and Practice of Music. But, if he chooses to hear the same principles delivered without that unnecessary parade, let him be instructed by d'Alembert; by Rameau, in the principles of composition; and by Rousseau's Musical Dictionary. It is true, that the forms and proportions of instruments, the thickness, length, and tension, of musical strings, may be mathematically adjusted; their relations

relations one to another may be determined by the coincidence of their vibrations, or by the number and velocity of thefe vibrations when diffonant; but experience and a good ear are amply fufficient for thefe purpofes. Yet, if the neceffity of geometry in mufic fhould ftill remain an indelible article in his creed, he may confider Dr. Smith's Philofophical Principles of Harmony. There has alfo been publifhed, an explication of Tartini's theory, intitled The Principles and Power of Harmony; which, after he has made confiderable progrefs, may be read to him with fenfible advantage.

To elucidate farther the extraordinary faculty of blind perfons, we fhall here fubjoin the following extraordinary particulars of two blind ladies.—The firft of thefe ladies became blind in confequence of the confluent fmall-pox. In the courfe of this difeafe, in which fhe was attended by the late Sir Hans Sloane, feveral threatening fymptoms appeared, which however were at length overcome: and the patient, being thought out of danger, took feveral dofes of fuch purgative medicines as are ufually adminiftered in the decline of the difeafe, without any bad confequence. But, in the evening of the day on which fhe had taken the laft dofe that was intended to be given her on that occafion, fhe was fuddenly feized with pains and convulfions in the bowels; the pain and other fymptoms became gradually lefs violent as the force of the medicine abated, and, by fuch remedies as were thought beft adapted to the cafe, they feemed at length to be entirely fubdued. They were, however, fubdued only in appearance; for at eleven o'clock of the forenoon of the next day they returned with great violence, and continued fome hours; when they went off, they left the mufcles of the lower jaw fo much relaxed, that it fell down, and the chin was fupported on the breaft. The ftrength of the patient was fo much exhaufted during this paroxyfm, that fhe lay near two hours with no other figns of life than a very feeble refpiration, which was often fo difficult to be difcerned, that thofe about her concluded fhe was dead.

From this time the fits returned periodically every day, at about the fame hour. At firft they feemed to affect her nearly in the fame degree; but at length all the fymptoms were aggravated, the convulfions became more general, and her arms were fometimes convulfed alternately; it alfo frequently happened, that the arm which was laft convulfed remained extended and inflexible fome hours after the ftruggles were over. Her neck was often twifted with fuch violence, that the face looked directly backwards, and the back part of the head was over the breaft; the mufcles of the countenance were alfo fo contracted and writhed by the fpafms, that the features were totally changed, and it was impoffible to find any refemblance of her natural afpect by which fhe could be known. Her feet were not lefs diftorted than her head; for they were twifted almoft to diflocation at the inftep, fo that fhe could not walk but upon her ancles.

To remove or mitigate thefe deplorable fymptoms, many remedies were tried; and, among others, the cold bath: but either by the natural effect of the bath, or by fome mifmanagement in the bathing, the unhappy patient firft became blind, and foon afterwards deaf and dumb. It is not eafy to conceive what could increafe the mifery of deafnefs, dumbnefs, blindnefs, and frequent paroxyfms of excruciating pain: yet a very confiderable aggravation was added; for the lofs of her fight, her hearing, and her fpeech, was followed by fuch a ftricture of the mufcles of her throat, that fhe could not

ſwallow any kind of aliment either ſolid or liquid. It might reaſonably be ſuppoſed that this circumſtance, though it added to the degree of her miſery, would have ſhortened its duration; yet in this condition ſhe continued near three quarters of a year; and during that time was ſupported in a very uncommon manner, by chewing her food only; which having turned often, and kept long in her mouth, ſhe was obliged at laſt to ſpit out. Liquors were likewiſe gargled about in her mouth for ſome time; and then returned in the ſame manner, no part of them having paſſed the throat by an act of deglutition: ſo that whatever was conveyed into the ſtomach, either of the juices of the ſolid food, or of liquids, was either gradually imbibed by the ſponginefs of the parts, which they moiſtened, or trickled down in a very ſmall quantity along the ſides of the veſſels.

But there were other peculiarities in the caſe of this lady, yet more extraordinary. During the privation of ſight and hearing, her touch and her ſmell became ſo exquiſite, that ſhe could diſtinguiſh different colours of ſilk and flowers, and was ſenſible when any ſtranger was in the room with her. After ſhe became blind, and deaf, and dumb, it was not eaſy to contrive any method by which a queſtion could be aſked her, and an anſwer received. This, however, was at laſt effected, by talking with the fingers, at which ſhe was uncommonly ready. But thoſe who converſed with her in this manner, were obliged to expreſs themſelves by touching her hand and fingers inſtead of their own. A lady who was nearly related to her, having an apron on, that was embroidered with ſilk of different colours, aſked her, in the manner which has been deſcribed, if ſhe could tell what colour it was? and after applying her fingers attentively to the figures of the embroidery, ſhe replied, that it was red, and blue, and green; which was true. The ſame lady having a pink-coloured ribbon on her head, and being willing ſtill farther to ſatisfy her curioſity and her doubts, aſked what colour that was? her couſin, after feeling ſome time, anſwered that it was pink colour: this anſwer was yet more aſtoniſhing, becauſe it ſhowed not only a power of diſtinguiſhing different colours, but different kinds of the ſame colour; the ribbon was not only diſcovered to be red, but the red was diſcovered to be of the pale kind called a *pink*.

"This unhappy lady, conſcious of her own uncommon infirmities, was extremely unwilling to be ſeen by ſtrangers, and therefore generally retired to her chamber, where none but thoſe of the family were likely to come. The ſame relation, who had by the experiment of the apron and ribbon diſcovered the exquiſite ſenſibility of her *touch*, was ſoon after convinced by an accident, that her power of *ſmelling* was acute and refined in the ſame aſtoniſhing degree. Being one day viſiting the family, ſhe went up to her couſin's chamber, and, after making herſelf known, ſhe intreated her to go down, and ſit with her among the reſt of the family, aſſuring her, that there was no other perſon preſent: to this ſhe at length conſented, and went down to the parlour door; but the moment the door was opened, ſhe turned back, and retired to her chamber much diſpleaſed; alleging, that there were ſtrangers in the room, and that an attempt had been made to deceive her: it happened indeed that there were ſtrangers in the room; but they had come in while the lady was above ſtairs, ſo that ſhe did not know they were there. When ſhe had ſatisfied her couſin of this particular, ſhe was pacified; and

and being afterwards aſked how ſhe knew there were ſtrangers in the room, ſhe anſwered, by the ſmell.

But though ſhe could by this ſenſe diſtinguiſh in general between perſons with whom ſhe was well acquainted and ſtrangers, yet ſhe could not ſo eaſily diſtinguiſh one of her acquaintance from another without other aſſiſtance. She generally diſtinguiſhed her friends by feeling their hands; and when they came in, they uſed to preſent their hands to her, as a mean of making themſelves known: the make and warmth of the hand produced in general the differences that ſhe diſtinguiſhed; but ſometimes ſhe uſed to ſpan the wriſt, and meaſure the fingers. A lady, with whom ſhe was very well acquainted, coming in one very hot day, after having walked a mile, preſented her hand as uſual; ſhe felt it longer than ordinary, and ſeemed to doubt whoſe it was; but after ſpanning the wriſt, and meaſuring the fingers, ſhe ſaid, ‘It is Mrs. M. but ſhe is warmer to-day than ever I felt her before.’

To amuſe herſelf in the mournful and perpetual ſolitude and darkneſs to which her diſorder had reduced her, ſhe uſed to work much at her needle; and it is remarkable, that her needle-work was uncommonly neat and exact: among many other pieces of her work that are preſerved in the family, is a pin-cuſhion, which can ſcarcely be equalled. She uſed alſo ſometimes to write; and her writing was yet more extraordinary than her needle-work: it was executed with the ſame regularity and exactneſs; the character was very pretty, the lines were all even, and the letters placed at equal diſtances from each other: but the moſt aſtoniſhing particular of all, with reſpect to her writing, is, that ſhe could by ſome means diſcover when a letter had by ſome miſtake been omitted, and would place it over that part of the word where it ſhould have have been inſerted, with a caret under it. It was her cuſtom to ſit up in bed at any hour of the night, either to write or to work, when her pain or any other cauſe kept her awake.

Theſe circumſtances were ſo very extraordinary, that it was long doubted whether ſhe had not ſome faint remains both of hearing and ſight, and many experiments were made to aſcertain the matter; ſome of theſe experiments ſhe accidentally diſcovered, and the diſcovery always threw her into violent convulſions. The thought of being ſuſpected of inſincerity, or ſuppoſed capable of acting ſo wicked a part as to feign infirmities that were not inflicted, was an addition to her miſery which ſhe could not bear, and which never failed to produce an agony of mind not leſs viſible than thoſe of her body. A clergyman, who found her one evening at work by a table with a candle upon it, put his hat between her eyes and the candle, in ſuch a manner that it was impoſſible ſhe could receive any benefit from the light of it if ſhe had not been blind. She continued ſtill at her work with great tranquillity; till putting up her hand ſuddenly to rub her forehead, ſhe ſtruck it againſt the hat, and diſcovered what was doing; upon which ſhe was thrown into violent convulſions, and was not without great difficulty recovered. The family were by theſe experiments, and by ſeveral accidental circumſtances, fully convinced that ſhe was totally deaf and blind; particularly by ſitting unconcerned at her work during a dreadful ſtorm of thunder and lightning, though ſhe was then facing the window, and always uſed to be much terrified in ſuch circumſtances. But Sir Hans Sloane,

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her phyſician, being ſtill doubtful of the truth of facts which were ſcarcely leſs than miraculous, he was permitted to ſatisfy himſelf by ſuch experiments and obſervations as he thought proper; the iſſue of which was, that he pronounced her to be abſolutely deaf and blind.

She was at length ſent to Bath, where ſhe was in ſome meaſure relieved; her convulſions being leſs frequent, and her pains leſs acute: but ſhe never recovered her ſpeech, her ſight, or her hearing, in the leaſt degree. Many of her letters dated at Bath, in ſome of which there are inſtances of interlineations with a caret, are now in the cuſtody of the widow of one of her brothers, who, with many other perſons, can ſupport the facts here related, however wonderful, with ſuch evidence as it would not only be injuſtice, but folly, to diſbelieve.

Account of a French Lady, blind from her Infancy, who can read, write, and play at Cards, &c.

A young gentlewoman of a good family in France, loſt her ſight when only two years old, her mother having been adviſed to lay ſome pigeons blood on her eyes, to preſerve them in the ſmall pox; whereas, ſo far from anſwering the end, it ate into them. Nature, however, may be ſaid to have compenſated for the unhappy miſtake, by beauty of perſon, ſweetneſs of temper, vivacity of genius, quickneſs of conception, and many talents which certainly muſt alleviate her misfortune.

She plays at cards with the ſame readineſs as others of the party. She firſt prepares the packs allotted to her, by pricking them in ſeveral parts; yet ſo imperceptibly, that the cloſeſt inſpection can ſcarcely diſcern her indexes. She ſorts the ſuits, and arranges the cards in their proper ſequence, with the ſame preciſion, and nearly the ſame facility, as they who have their ſight. All ſhe requires of thoſe who play with her, is to name every card as it is played; and theſe ſhe retains ſo exactly, that ſhe frequently performs ſome notable ſtrokes, ſuch as ſhew a great combination and ſtrong memory.

The moſt wonderful circumſtance is, that ſhe ſhould have learned to read and write; but even this is readily believed on knowing her method. In writing to her, no ink is uſed, but the letters are pricked down on the paper; and by the delicacy of her touch, feeling each letter ſhe follows them ſucceſſively, and reads every word with her finger ends. She herſelf in writing makes uſe of a pencil, as ſhe could not know when her pen was dry; her guide on the paper is a ſmall thin ruler and of the breadth of her writing. On finiſhing a letter, ſhe wets it, ſo as to fix the traces of her pencil, that they are not obſcured or effaced; then proceeds to fold and ſeal it, and write the direction: all by her own addreſs and without the aſſiſtance of any other perſon. Her writing is very ſtraight, well cut, and the ſpelling no leſs correct. To reach this ſingular mechaniſm, the indefatigable cares of her affectionate mother were long employed, who accuſtomed her daughter to feel letters cut in cards or paſte-board, brought her to diſtinguiſh an A from a B, and thus the whole alphabet, and afterwards to ſpell words; then, by the remembrance of the ſhape of the letters, to delineate them on paper; and laſtly, to arrange them ſo as to form words and ſentences.

She has learned to play on the guittar, and has even contrived a way of pricking down the tunes as an aſſiſtance to her memory. So delicate are her organs, that in ſinging a tune, though new to her, ſhe

ſhe is able to name the notes. In figured dances ſhe acquits herſelf extremely well, and in a minuet with inimitable eaſe and gracefulneſs. As for the works of her ſex, ſhe has a maſterly hand; ſhe ſews and hems perfectly well; and in all her works ſhe threads the needle for herſelf, however ſmall. By the watch her touch never fails telling her exactly the hour and minute.

From this account, however, it would appear, that, except reading and writing, the French lady has nothing to boaſt of in which ſhe was not excelled by Mr. Stanley above mentioned, if we may credit all that is reported of him. The works peculiar to her ſex are gained mechanically; but the diſtinguiſhing colours, telling the preciſe time by a watch, naming the notes in muſic, and many other things depending upon the ear and touch, are ſaid to have been ſo familiar to him, that his friends ceaſed to think them extraordinary. Attainments ſtill more wonderful are aſcribed to him; as, the naming the number of perſons in a room on entering it; the directing his voice to each perſon in particular, even to ſtrangers when they had once ſpoken, the miſſing any perſon abſent, and telling who that perſon was; and, laſtly, his ability to form juſt conceptions of youth, beauty, ſymmetry, and ſhape.

Behaviour of a Perſon born blind, on receiving his Sight at twenty Years of Age by the Operation of an Oculiſt.

The operator, Mr. Grant, having obſerved the eyes of his patient, and declared to his friends and relations that it was highly probable he ſhould be able to remove the obſtacle which prevented the uſe of his ſight; all his acquaintance, either out of regard or curioſity, aſſembled on the occaſion. The Rev. Mr. Caſwell, miniſter of the place, deſired the company, in caſe the operation ſhould ſucceed, to keep quiet, and ſuffer the young man to make his own obſervations, without the direction of any thing he had received by his other ſenſes, or the opportunity of diſcovering his friends by their voices.—Among others, his mother, his brothers and ſiſters, and a young lady for whom he had a paſſion, were preſent.

The operation had the wiſhed-for ſucceſs. When the patient firſt received the dawn of light, there appeared ſuch an extacy in his action, that he ſeemed ready to ſwoon away in the ſurprize of joy and wonder. The ſurgeon ſtood before him with his inſtruments in his hands. The young man obſerved him from head to foot; after which he ſurveyed himſelf as carefully, and ſeemed to compare him to himſelf; and, obſerving both their hands, ſeemed to think they were exactly alike, except the inſtruments, which he took for parts of his hands. When he had continued in this amazement ſome time, his mother could no longer bear the agitations of ſo many paſſions as thronged upon her, but fell upon his neck, crying out, My ſon! my ſon! The youth knew her voice, and could ſpeak no more than, Oh me! are you my mother? and fainted. The whole room, you will eaſily conceive, were very affectionately employed in recovering him; but above all, the young gentlewoman who loved him, and whom he loved, ſhrieked in the loudeſt manner. That voice ſeemed to have a ſudden effect upon him as he recovered, and he ſhewed a double curioſity in obſerving her as ſhe ſpoke and called to him; till at laſt he broke out, What has been done to me? Whither am I carried? Is all this about me the thing I have ſo often

often heard of? Is this the light? Is this ſeeing? Were you always thus happy, when you ſaid you were glad to ſee each other? Where is Tom, who uſed to lead me? But I could now, methinks, go any where without him. He offered to move, but ſeemed afraid of every thing around him. When they ſaw his difficulty, they told him, till he became better acquainted with his new being, he muſt let the ſervant ſtill lead him. The boy was called for, and preſented to him. Mr. Caſwell aſked him, what ſort of thing he took Tom to be, before he had ſeen him. He anſwered, he believed there was not ſo much of him as of himſelf; but he fancied him the ſame ſort of creature. The noiſe of this ſudden change made all the neighbourhood throng to the place where he was. As he ſaw the croud thickening, he deſired Mr. Caſwell to tell him how many there were in all to be ſeen. The gentleman, ſmiling, anſwered him, That it would be very proper for him to return to his late condition, and ſuffer his eyes to be covered, till they had received ſtrength; for he might remember well enough that by degrees he had from little and little come to the ſtrength he had at preſent in his ability of walking and moving; and that it was the ſame thing with his eyes, which, he ſaid, would loſe the power of continuing to him that wonderful tranſport he was now in, except he would be contented to lay aſide the uſe of them, till they were ſtrong enough to bear the light without ſo much feeling as he knew he underwent at preſent. With much reluctance he was prevailed on to have his eyes bound, in which condition they kept him in a dark room, till it was proper to let the organ receive its objects without farther precaution. After ſome days it was thought fit to unbind his head, and the young lady whom he loved was inſtructed to open his eyes accordingly, as well to endear herſelf to him by ſuch a circumſtance, as to moderate his extacies by the perſuaſion of a voice, which had ſo much power over him as her's ever had. When this beloved young woman began to take the binding off his eyes, ſhe talked to him as follows:

"Mr. ——, I am now taking the binding off; though, when I conſider what I am doing, I tremble with the apprehenſion, that (though I have from my very childhood loved you, dark as you were, and though you had conceived ſo ſtrong a love for me) you will find there is ſuch a thing as beauty, which may enſnare you into a thouſand paſſions of which you are now ignorant, and take you from me for ever. But, before I put myſelf to that hazard, tell me in what manner that love, you always profeſſed to me, entered into your heart; for its uſual admiſſion is at the eyes."

The lover anſwered, "Dear Lydia, if I am to loſe by ſight the ſoft pantings which I have always felt when I heard your voice; if I am no more to diſtinguiſh the ſtep of her I love, when ſhe approaches me, but to change that ſweet and frequent pleaſure for ſuch an amazement as I knew the little time I lately ſaw; or if I am to have any thing beſides, which may take from me the ſenſe I have of what appeared moſt pleaſing to me at that time, (which apparition it ſeems was you,) pull out theſe eyes, before they lead me to be ungrateful to you, or undo myſelf. I wiſhed for them but to ſee you; pull them out, if they are to make me forget you."

We have the ſatisfaction of being informed, that the Aſylum for the Blind, ſome time ſince eſtabliſhed at Liverpool, bids fair to

anſwer every benevolent purpoſe, for which it was founded. The following Stanzas, written in praiſe of this inſtitution, are ſo excellent, that we ſhall conclude this article with them.

On the Aſylum for the Blind at Liverpool.

Stranger, pauſe :—for thee the day
Smiling pours its cheerful ray,
Spreads the lawn and rears the bower,
Lights the ſtream and paints the flower.

Stranger, pauſe :—with ſoften'd mind
Learn the ſorrows of the blind.
Earth and ſeas, and varying ſkies
Viſit not their cheerleſs eyes.

Not for them the bliſs to trace
The chiſſel's animating grace ;
Nor on the glowing canvaſs find
The poet's ſoul, the ſage's mind.

Not for them the heart is ſeen,
Speaking thro' the expreſſive mien ;
Not for them are pictur'd there
Friendſhip, pity, love ſincere.

Helpleſs as they ſlowly ſtray,
Childhood points their cheerleſs way ;
Or the wand exploring guides
Fault'ring ſteps, where fear preſides.

Yet for them has genius kind
Humble pleaſures here aſſign'd :
Here with unexpected ray,
Reach'd the ſoul that felt no day.

Lonely blindneſs here can meet
Kindred woes, and converſe ſweet ;
Torpid once, can learn to ſmile
Proudly o'er its uſeful toil.

He, who deign'd for man to die,
Op'd on day the darken'd eye ;
Humbly copy—thou canſt feel—
Give thine alms—thou canſt not heal.

NAVIGATION OF THE RED SEA.

THE Red Sea, or Arabian Gulph, ſo renowned in ſacred hiſtory, and ſo much the object of preſent curioſity, ſeparates Arabia from part of Egypt, and from Upper Ethiopia. It is nearly 350 leagues in length, and at an average about forty in breadth. Its tides differ little from thoſe of the Indian Ocean, with which it communicates by the Streights of Babelmandel ; but it is not much expoſed to tempeſts ; the winds uſually blow from north to ſouth, and being periodical, like the monſoons of India, determine the ſeaſon for ſailing in or out of this ſea.

Mr. Bruce deſcribes all its weſtern ſhore to be bold, [ſtanding out to view, or ſtriking to the eye,] and to have more depth of water than

than the eaſt; but on the former there is neither anchoring-ground nor ſhoals. It is rocky, with a conſiderable depth of water; and the rocks, though not viſible, are yet ſufficiently near the ſurface to deſtroy a large ſhip: the cauſe is ſuppoſed to be, that the mountains on the ſide of Abyſſinia and Egypt are all of hard ſtone, porphyry, many different kinds of marble, granite, alabaſter, and baſaltes.

Theſe, being all compoſed of ſolid materials, can therefore part with very little duſt or ſand, which might otherwiſe be blown from them into the ſea. On the oppoſite ſide, the whole conſiſts of moving ſands, a large quantity of which is blown from the ſouth-eaſt by the dry winter monſoons, which, being lodged among the rocks on that ſide, and confined there by the north-eaſt or ſummer monſoons, are prevented from coming over to the Egyptian ſide. Hence the weſt coaſt is full of ſunken rocks, for want of ſand to cover them, with which they would otherwiſe become iſlands: they are naked and bare all round, with ſharp points like ſpears; while, on the eaſt ſide, every rock becomes an iſland, and every two or three iſlands become a harbour.—On the ends of the principal of theſe harbours are piled great heaps of ſtones, to ſerve as ſignals; 'and it is there,' ſays Bruce, 'that the large veſſels from Cairo to Jidda, equal in ſize to a 74-gun ſhip, (but, from the ciſtern of maſon-work built within for holding water, nearly double its weight,) after navigating their portion of the channel in the day-time, come ſafely and quietly to anchor at four o'clock in the afternoon, and in theſe little harbours paſs the night, to ſail again next morning into the channel.'

From the obſervations made by Mr. Bruce on the navigation of the Red Sea, he undertakes to point out a ſafe paſſage for large ſhips to the Gulph of Suez, ſo that they may be able to judge of the propriety of their own courſe themſelves, without truſting implicitly to the pilots they meet with, who are often ignorant of their buſineſs. This ſea, according to Mr. B. may be divided into four parts, of which the channel occupies two, till near the latitude of 26 degrees, or that of Coſſeir; on the weſt is deep water, with many rocks; and on the eaſt it is full of iſlands, as we have already ſtated. Between theſe iſlands there are channels and harbours of deep water, where ſhips may be protected in any wind; but a pilot is neceſſary in ſailing among thoſe from Mocha to Suez, and the voyage, beſides, can be continued only during part of the day. Ships bound to Suez without the conſent of the xeriffe of Mecca, that is, without any intention of ſelling their cargo at Jidda, or paying cuſtom there, ought to take in freſh water at Mocha; or, if there be any reaſon againſt this, a few hours will carry them to Azab, or Saba, on the Abyſſinian coaſt, where they may be plentifully ſupplied; but it muſt be remembered, 'that the people here are Galla, the moſt treacherous and villainous wretches upon earth.' Here not only water may be procured, but plenty of ſheep and goats, with myrrh and incenſe in the proper ſeaſon. Great caution, however, muſt be uſed in dealing with the people, as even thoſe of Mocha, who are abſolutely neceſſary to them in their commercial dealings, cannot truſt them without ſurety or hoſtages. Some years ago, the ſurgeon and mate of the Elgin Eaſt-Indiaman, with ſeveral ſailors, were murdered by thoſe ſavages as they went on-ſhore to purchaſe myrrh, though they had a letter of ſafe conduct from the ſheik.

WOOLLEN MANUFACTURES OF NORTH WALES.

THE webs are diſtinguiſhed by the trade into two ſorts : 1. what they call ſtrong cloth, or high-country cloth ; 2. ſmall cloth, or low-country cloth.

1. Strong cloth is made in Merionethſhire, and principally in the neighbourhood of Dolgelly and Machynlleth : at this latter place a manufactory on a ſmall ſcale has been lately [1796] eſtabliſhed, a circumſtance only worth notice as marking the commencement of a change in preparing the wool which will probably ſoon become general. Almoſt every little farmer makes webs, and few cottages in theſe parts are without a loom : all kind of wool is uſed indiſcriminately, and a conſiderable quantity of refuſe from the wool-ſtaplers and ſkinners is collected from the different quarters to be worked up here. During peace much Kentiſh wool uſed to be imported : many farmers, however, employ wool of their own growth, and this produces by far the beſt kind of cloth. The ſtandard width of this article is ⅞ of a yard ; the length of the piece, or what is emphatically ſtiled a web, is about two hundred yards, conſiſting of two ends of one hundred yards each, being thus divided for the convenience of carriage. The quality is neceſſarily of various degrees. The price has been rapidly advancing, and has added from three to five pence per yard to the former value of the article. In its rough ſtate it may at preſent be purchaſed of the manufacturer at every price between 11d. and 20d. a yard. The market for this cloth is Shrewſbury : it was actually the market a few years ago, but is now little more than nominally ſo ; a market however is regularly holden every Thurſday, in a great room belonging to the drapers' company, into which none but the members of that corporation are admitted ; and to this monopoly is aſcribed the removal of the market from Shrewſbury, as perſons not of the fraternity, but who purſued the ſame trade, intercepted the cloth in its way to the town ; ſo that even the drapers themſelves, whenever trade is briſk, are obliged to 'go up into the country,' as the phraſe is, and buy goods wherever they can find them,—at Dolgelly, at Machynlleth, at the villages, farm-houſes, cottages, fulling-mills, &c. In conſequence of this, it is now become a cuſtom with the principal drapers to keep ſervants the greater part of the year at Dolgelly or its neighbourhood, who get acquainted with the perſons who make cloth ; aſſiſt the poorer ones probably with ſmall ſums of money to buy wool ; and, in fact, ſuperintend the making and dreſſing of the goods.

The following is the whole proceſs undergone by this article before exportation : The wool is firſt prepared by hand in the uſual manner for the loom ; when woven into cloth, it is ſent to the fulling-mill, where it undergoes the operations of ſcouring, bleaching, and milling ; and is then fit for the market. When purchaſed by the drapers, it is treated in various ways : either it is merely committed to the ſheermen, who raiſe the wool on one ſide with cards, which is called *rowing* ; or it is ſent again to the mill, where it is ſometimes thickened to a ſurpriſing ſubſtance, which adds greatly to the price, on account of the loſs in ſhrinking ; or it is ſtretched, and thus made three or four inches wider, an operation which likewiſe enhances the value ; or, laſtly, it is converted into a frieze or

napped cloth. It is then put under the packing-prefs. Being formed into bales of different fizes, containing from five hundred up to two thoufand yards, it is ufually fent either to London or Liverpool, and thence exported to Germany and America. A quantity comparatively inconfiderable is ufed at home for workmen's jackets, ironing-cloths, blankets, &c.

2. Small cloth is the produce of Denbighfhire: it is entirely manufactured in the parifh of the Glynn, a large tract of country including Llangollen and Corwen. There is no eftablifhed factory for this article.—Small cloth is about $\frac{1}{8}$ of a yard narrower than ftrong cloth; its length is the fame. The beft was purchafed in 1795 at 16 or 17 pence a-yard; but this was thought a moft extravagant price, 14d. having been formerly deemed its full value. This cloth is ufed chiefly for dying; fome quantity is indeed fent off in its native or white ftate; but all that is dyed is, or ought to be, of this kind; the reafon of which is, that the coarfer fort of the high-country cloth abounds with long white hairs incapable of taking the dye, called *kemps*. This fabric is made of the coarfer part of the very long wool that grows round Ofweftry. Of this wool the finer part is converted into a fort of flannel called Ofweftry flannel, in fubftance between a common Welfh flannel and a web; its breadth is $\frac{3}{4}$ of a yard; its value from ten to fifteen pence at Ofweftry, which is the market for this article, as well as for fmall cloth. There is no hall or other building at Ofweftry appropriated for the fale of woollens; but the cloths are conveyed by the venders into any garret, ftable, parlour, or kitchen, they can procure, and the purchafers hunt them out as well as they are able: the market is however generally confined to one or two ftreets, and there is little doubt but a proper warehoufe of expofure will fhortly be built.

The purpofes to which webs are applied abroad are many and various. The clothing of the flaves in the Weft Indies and South America creates a large demand; ftockings are faid to be made of them in Germany and other parts of the continent; and the Emprefs of Ruffia at one time clothed part of her troops with them.

But flannels conftitute the grand and moft important of the Welfh manufactures. The texture and ufes of this comfortable commodity it is unneceffary to point out. Though chiefly the produce of Montgomeryfhire, it is by no means confined to that county, being made in various places within a circle of about twenty miles round Welfh Pool. There is only one manufactory of note in this line in Wales: it is at Dolobran, near Pool, and is faid to be a parifh-concern; it was eftablifhed about the year 1790. There are a few other infant factories, at Newtown, Machynlleth, &c. but thefe as yet are of little confequence. The adjoining county of Shropfhire partakes with Wales in this capital manufacture, and, being more wealthy, has in general fubftituted machinery to manual labour. Several individuals in Shrewfbury and its neighbourhood employ themfelves fuccefsfully in this bufinefs; but by far the greateft undertaking of the kind is a factory about four or five miles from Shrewfbury, at a place called the Ifle, belonging to Meffrs. Cooke and Mafon, erected in 1792. The mill is fituated on the neck of a horfefhoe-like winding of the Severn whofe diameter is about three hundred yards, whereas the river makes a ferpentine courfe of nearly three miles before it arrives from the upper part of the ifthmus at the lower; a tunnel

tunnel five feet in diameter is worked through the neck, opening into the bed of the upper part of the river, and a great wheel is placed at the other extremity; this wheel gives motion to a vaſt ſeries of machinery for ſpinning, fulling, and many other operations. The power that works the wheel is immenſe, being a ſolid cylinder of water five feet in diameter, with a fall more than ſeventeen times greater than the Severn, which is itſelf a rapid river. Various were the apparent difficulties, and numerous the unforeſeen accidents, which combined to baffle the deſign, ariſing from floods, and a bed of looſe ſand lying in the direction of the tunnel: all theſe however have been at length overcome by the perſeverance and great mechanical ſkill of Mr. Maſon; and the ſucceſs of the undertaking bids fair to be as complete as in its execution it was arduous.

As yet by far the greater part of the thouſands of pieces of flannel which are ſold at Pool is the produce of manual labour; but the uſe of machinery increaſes, and will ſpeedily become general. Formerly the Welſh beſtowed no pains in ſorting the wool: a fleece was broken into two parts, never into more than three: they have now however learnt the economy of a little more trouble, and can make diſtinctions of ſorts to the number of ſeven or eight; and the conſequence is a great variation in the texture of flannels, ſo that ſome have been ſold ſo low as ſixpence, while others have been diſpoſed of at four ſhillings, per yard.—Coarſe goods are at preſent very ſcarce, and extravagantly dear, none being to be had under eleven or twelve pence per yard. The market at Pool is once a fortnight, on Monday. Each manufacturer uſed to bring his own goods; but of late a ſet of middle men has ſprung up, called Welſh drapers, a ſort of jobbers or foreſtallers, who go about the country to the different cottages, and buy all the flannel that they can lay their hands upon. Their number increaſes, and with it the price of flannel, ſo that ſhortly the whole trade of ſelling at the market will be in their hands. Theſe men generally have large lots of cloth, from eight to twenty pieces, each one hundred yards on an average, out of which they will not ſell a ſingle piece but at an advanced price, by which means they get rid of many ordinary and damaged articles. At this market nothing is bought upon credit, every piece being paid for as ſoon as meaſured, in hard caſh, or bank notes: it is the ſame with webs, and the reſt of the Welſh woollen manufactures; whoever purchaſes muſt depoſit the value in ready money, and pay the carriage home of the goods bought. No calculation has been made of the number of yards manufactured, nor indeed is it conjecturable. Very little flannel is immediately exported by the Shrewſbury drapers, who, for the moſt part, ſell their goods to the London merchants: by theſe, flannels, as well as other woollens, are ſent to the continent, to America, and to the Weſt Indies: the chief demand however is inland. It is impoſſible to tell the number of pieces exported, except by inquiries at the ports; for, though each draper may know the proportion exported of his own goods, yet no one is acquainted with what his neighbour exports.

Flannels, and cloths, i. e. webs, are dyed of various colours; but not in Wales, except what is conſumed at home; and indeed it is ſeldom that a Welſhman (among the lower claſſes) wears a coat that is not made in the principality: the uſual colours are blue, drab, brown, or mixed.—Conſiderable quantities are dyed at Shrewſbury; and

and there is a dye-houſe at Le Botwood, near Dorrington, chiefly for this purpoſe.—Some flannels alſo have been ſent into Lancaſhire, or the borders of Yorkſhire, to be dyed; but this is by no means a common practice. More webs than flannels are dyed; but of the webs, far more are ſent off in the white than in colours.

As to the fulling-mills, there is nothing peculiar in their conſtruction; it may however be remarked that the ſtocks or hammers are not ſo heavy for flannels as webs.

Stockings, wigs, ſocks, gloves, and other ſmall knit articles, are ſold chiefly at Bala, being made in the town and neighbourhood: they are generally purchaſed by Welſh hoſiers, who travel through the adjoining Engliſh counties, and ſupply the ſhops and warehouſes; from the latter they are diſperſed through the iſland. Stockings are of all colours, greys of a thouſand ſhades, white, blue, red, &c. from ſix to nine ſhillings per dozen.

BUONAPARTE's EXPEDITION.—Continued from p. 249.

BUONAPARTE ſtill remains at Cairo; and ſeems to have laid aſide the deſign of penetrating to India, at leaſt for the preſent ſeaſon.—The following retroſpect, and details of what has happened ſince our laſt, are taken from the moſt authentic Paris accounts.

Buonaparte did not make himſelf maſter of Egypt before the end of the ſummer. He found at Suez but a few veſſels, and thoſe in a bad condition. The monſoon being againſt him at the autumnal equinox, he found that he had not time to caulk thoſe veſſels, or to put to ſea. He immediately abandoned his plan of going to India, and his army began to conſider itſelf as fixed in Egypt. The loſs of the fleet enſued; and this was followed by the declaration of war on the part of Turkey, their threats of invaſion, &c. The French, finding themſelves thus ſhut up, immediately turned their thoughts to defending themſelves and their conqueſts.

The month of Fructidor (Auguſt) was rather diſtreſſing, on account of the extreme heat, the calms, and the exhalations which followed the retreat of the Nile; but in the month of Vendemaire (September) the ground was covered with trefoil: milk, beer, fleſh, fiſh, and vegetables, were all abundant. The army recovered from its fatigues: it is about to paſs the winter there, and inure itſelf to the climate.—In the mean time Buonaparte, ever vigilant, devotes himſelf to the adminiſtration and improvement of this important conqueſt: he deſcends to Damietta and Roſetta, and puts the coaſt in a ſtate of defence at every point; he orders the neceſſary forts on the confines of the deſert near Suez, and in the Higher Egypt. He keeps his troops in exerciſe, raiſes recruits in the country, and makes uſe rather of art than of force to form a party amongſt the natives. He avails himſelf of the diſtinctions, civil and religious, to attach to him the Copts, the Bedouins, and the peaſantry. He flatters their ſelf-love by adopting ſeveral of their cuſtoms, in order that they may more eaſily accommodate themſelves to his. He found them melancholy, choleric, and fretful, through the influence of tyranny: he has rendered them gay, good, and amiable, by the means of games, feaſts, and muſic. He turns the moſt uſeful labours into amuſement, and repairs the highways, the bridges, and the canals. He found the peaſants ſlaves, and he has endowed them with property.

The

The Grand Signor inherited every ſucceſſion: Buonaparte has conſecrated the right of inheritance in every family; he beſtows on every child an equal ſhare; and ſuddenly, but without a ſhock, he has ameliorated the condition of the women, by giving them an equal portion of the deſcending property, with a right to diſpoſe of it at will. He marries his ſoldiers to the women of the country, prohibits all premature marriages, lays reſtraints on polygamy, and, in a word, is founding in Aſia a new civil code.

By his œconomy and foreſight he is reviving the manufactures of the country. He has prohibited the ruinous and abſurd luxury of Ruſſian hoops,. and of Cachemirian ſhawls. He has called upon the neutral provinces, and procured from them by the way of exchange, the iron, the copper, and the wood, for which he had occaſion. He is not likely to be in any want of powder.

He has appointed ſchools of inſtruction for the people, and military colleges, where the young French, the Copts, and the Arabs, inſtruct each other in the Arabic and French, in geography, the mathematics, and other ſciences. He has, in one word, created a nation; and, by managing the powerful reſources of enthuſiaſm, he has recalled to the Arabs the glory of their anceſtors. He has ſhewn them, in the French army, the miraculous inſtrument of the decrees of Providence, as wiſhing to revive the empire of the ancient Arabs, to deliver them from a barbarous yoke, to purify the laws of their prophet, which had been altered by ignorant or impious men, and to open in Aſia a new age of grandeur, of ſcience, and of glory.

On this the London papers make the following remarks.—It would be equally ſuperfluous and tedious to enter into a minute diſcuſſion of the variety of reports which are afloat in regard to Egypt. Thoſe which are official bear evident marks of partiality; but even from theſe accounts, a pretty exact ſtatement may be formed of the military and political poſition of the French in that ill-fated country, whoſe great diſtance from France has not been able to ſhelter it from the deſtructive viſit of the modern Vandals.

The French occupy Alexandria (forty miles from Roſetta), Cairo, Roſetta, and Damietta, which form the three ſalient angles of the Delta, a populous and fertile country. One of their corps ſeems to have marched up the Nile to a conſiderable diſtance, but the entrenched camp of Gizè, two leagues from Cairo, covers that town from incurſions from the ſide of Upper Egypt, which proves that they are not maſters of that country. To the north they are ſeparated by the ſea, and by vaſt deſerts from all inhabited countries. The forces which can attack them by land muſt come from Syria by the Iſthmus of Suez. The French have there poſted a ſmall body of troops, and run up ſome weak entrenchments; for what ſort of entrenchments can be conſtructed in a country without ſtone and wood, and whoſe ſoil conſiſts of a ſhifting ſand? This communicates with Cairo and Damietta by a deſert of which the Bedouin Arabs are maſters. It is clear that vaſt deſerts, the Nile, and its different branches, ſeparate all the different bodies of French troops, and they have no modes of communication with each other but ſuch as are extremely dangerous.—As ſoon as the Engliſh have once got ready the neceſſary ſhips of war to ſail up the two principal arms of the Nile, the low banks of which offer no advantage to the land-batteries, the communication with Damietta, the frontiers of Syria and Suez, and

Roſetta

Rofetta and Alexandria, can only be kept up by the way of Cairo, which, for a body of troops, requires at leaft three weeks marching.

The French army, at firft, confifted of 25,000 men, but is fince much diminifhed by actions and difeafes; it has no cavalry, and no ammunition and warlike ftores, but fuch as were brought on-board the tranfports; and it is left alone to defend that vaft extent of country, againft the troops which can be landed every where from Alexandria to Damietta, againft the armies of Syria, againft the Arabian and Mamaluke horfe, and againft the inhabitants. The French have no other refource left than to recruit their army with the inhabitants of the country.

On the 22d of September, a grand civic feftival was given by the general at Grand Cairo, to celebrate the 7th anniverfary of the foundation of the French republic. The feftival was celebrated in every ftation of the army. Buonaparte gave at his head-quarters a dinner of 100 covers, to which all the generals, all the commanders of corps, and a great number of Turks of diftinction, were invited. The feftival began very early in the morning. The tri-coloured ftandard was planted on the column of Pompey, on the pyramids, on the ramparts of the ancient famous city of Thebes, and on the fhores of the Red Sea. At eight in the evening horfe and foot races took place, and the troops in Upper Egypt celebrated their feftival on the ruins of Thebes. The night was enlivened by a grand fire-work.—A pyramid was erected, whereon were engraved the names of thofe who fell in the action againft the Mamalukes; and on this occafion Buonaparte addreffed the army to the following effect:

"Soldiers, We celebrate the firft day of the 7th year of the republic.—Five years fince the independence of the French people was threatened with ruin; but you took Toulon, and that was the forerunner of the deftruction of our enemies.—A year after you vanquifhed the Auftrians at Dego.—The following year you were on the fummit of the Alps.—Two years ago you befieged Mantua, and you gained the celebrated victory of St. George.—Laft year you were at the fources of the Drave and the Ifonzo, on your return from Germany.—Who could then have predicted that you would be this day on the borders of the Nile, in the center of the ancient continents? From the Englifh, celebrated in arts and commerce, down to the hideous and favage Bedouins, you arreft the attention of the world.

"Soldiers, your deftiny is glorious, becaufe you are worthy of what you have atchieved, and of the opinion which is entertained of you. You will die with honour, like the gallant men whofe names are infcribed on this pyramid; or you will return to your country covered with laurels, and commanding the admiration of mankind. For five months paft, fince we have departed from Europe, we have been the conftant object of the anxiety of our fellow citizens. On this day, the thoughts of 40 millions of citizens are turned towards you. They all exclaim, It is to their labours, to the blood which they fhed, that we fhall be indebted for a general peace, for tranquillity, for the profperity of commerce, and the bleffings of civil liberty."

By an order iffued from the head-quarters, on the 29th of Auguft, it appears, that General Lannes was directed to proceed to the town of

of Alkam at the head of 500 men, to bring the magiſtrates priſoners to Cairo, give up the place to pillage, and not leave a houſe ſtanding, in conſequence of the inhabitants having aſſaſſinated the aid-de-camp Julien, and 15 French ſoldiers, by whom he was eſcorted. He was alſo enjoined to make known, by proclamation, to the neighbouring villages, that Alkam had been burnt, as a puniſhment inflicted upon its inhabitants, who had aſſaſſinated the French as they were purſuing their voyage on the Nile.

The following are the ſpeculations of Volney as to the deſtination of Buonaparte, which he thus puts into the mouth of that general: Let us leave to Zemaun Shah, and to Tippoo Sultan, the care of driving the Engliſh from Bengal. Zemann Shah alone can do this with his 120,000 knights. Beſides, why ſhould I go to the other end of the world to employ fruitleſs and inglorious efforts on an obſcure and barbarous theatre? When I ſhall have driven the Engliſh from India, will their power be ſhaken? Will they be the leſs on that account the maſters of the Ocean, or the maſters of the Mediterranean, in which they dare to ſay that I am a priſoner? Does not their alliance with the Ruſſians, for the purpoſe of deceiving the Turks, open to them a new world, for the purpoſe of glutting their avarice? No, it is not to the factories of Madras or Calcutta that I am to look for glory. It is not there that France, of which my army is a precious portion, can be uſeful. It is Europe that muſt be made the theatre of the war; and, ſince the Turk has been ſo imprudent as to rear the ſtandard of it, it is in Conſtantinople that I will tear it from his hands. I will put Egypt in a ſtate ſufficient for its defence and preſervation. I ſhall pave the way for my expedition, by gaining over to my ſide the Arabs, the Druſes, and the Maronites. When maſter of Syria, I ſhall there form my magazines, and ſhall protect, by the mountains, my rapid march on the ſkirts of the deſert. When arrived at the mountains of Cilicia, my poſition will be ſtrengthened: my left wing will be ſupported by the ſea, my right by the Euphrates. I ſhall be able to keep open my communications with the Diarbekir and Armenia, corn-countries, and which are diſaffected to the Grand Turk. I will call on the aſſiſtance of the Bedouins, Turcomans, Kurds, Armenians, and Perſians, to the ruin of their common enemy; and, forming a great body of cavalry, I ſhall ſoon croſs the ſix or ſeven hundred miles which ſeparate me from the Boſphorus, which I may perhaps croſs on rafts, and I will then enter Conſtantinople. There a new courſe is opened to me. I enter on the theatre of Europe, and form a counterpoiſe to all the powers. I ſhall be able either to eſtabliſh or ſtrengthen the republic of all Greece by Albania and Corfu. I ſhall be able to keep open the communication with Italy and France. I ſhall be able to raiſe Poland from its ruins, and to form a ſtate there which may maintain the ancient balance of the North. Ruſſia will be kept in check, and will be apprehenſive of internal diſturbances. Auſtria, placed between two enemies, will have ſtill greater cauſe to be alarmed, and will be apprehenſive for the enfranchiſement of Hungary. Pruſſia will reſume her ſtate of natural alliance with France and the new empire of Byzantium. Denmark and Sweden, relieved from the preſſure of Ruſſia, will increaſe both in their means and their influence. Moſcow, jealous of Peterſburgh, will reclaim its independence. England, driven from the Archipelago,

will quit the Mediterranean, and governments, tired at length with ſo much war, battles, fire, maſſacre, crime, and follies, will then in a maſs be ready to liſten to peace. May I be able to ſee that happy day, and to ſee an obeliſk in Conſtantinople bear this inſcription: "To the French army, the conquerors of Italy, of Africa, and of Aſia. To Buonaparte, member of the national inſtitute, the pacificator of Europe."

The intercepted correſpondence from the army of General Buonaparte in Egypt, of which ſo much has been ſaid, is now publiſhed. It is not only intereſting on account of the confeſſion of the perſons employed on the expedition, reſpecting the condition of the army, and the diſguſt which prevails in being ſent to ſuch an inhoſpitable country; but the introduction contains ſome very pertinent obſervations on the motives which induced the directory to ſet it on foot. The French had long turned their eyes towards Egypt. The ſanguine diſpoſition of their conſuls in the Levant had miniſtered with admirable effect to the credulity and avarice, and ambition, of this reſtleſs nation, by aſſuring them that Egypt was the Paradiſe of the Eaſt, the key of the treaſures of the Indies; eaſy to be ſeized, and ſtill more eaſy to be kept! There was not a Frenchman under the old regimen, who was not fully perſuaded of the truth of all this; and certainly they have loſt nothing of their ambition, their avarice, and their credulity, under the new.

Egypt, however, though ſaid and believed to be a rich country, promiſed no immediate ſupplies of plunder; and the project for ſeizing it would ſtill have remained in the port-folio of Citizen Talleyrand, had not a circumſtance happened that made its ſpeedy adoption a meaſure of neceſſity.

Every one knows that the directory long ſince engaged to make a free gift to the army, of 1000 million livres, at the concluſion of a general peace. This engagement, like many others, it ſeemed to have forgotten; till the neceſſity of attaching the troops to their intereſts, and thus enabling them to perfect the revolution of the 18th Fructidor, made it neceſſary for the triumvirate to renew their promiſe, and to revive the languid expectations of the army. None contributed more to the ſucceſs of this fatal day than the army of Italy, which, to the eternal diſgrace of Buonaparte, was permitted to overawe the councils, and to aſſume to itſelf the whole power of the ſtate. Such a ſervice could not be overlooked: their claim to a portion of the milliard became doubly valid; and, as the war in Italy was now ſuppoſed to be at an end, thouſands of them returned to France to claim it.

Here began the difficulties of the directory. They had no money to give; but it was not adviſable to confeſs it: and the expedition to Egypt was, therefore, brought forward, as an excellent expedient for quieting the preſent clamour, and providing for 40,000 veteran troops, inured to plunder, and impatient of controul; who were too ſenſible of their merits to be quietly laid aſide, and too urgent in their demands to be cajoled with empty promiſes.

Hence aroſe the expedition to Egypt, which was to eclipſe, in immediate advantages, the boaſted conqueſts of Cortes and Pizarro.

It appears from ſome of Buonaparte's letters, that he had not the ſlighteſt idea of wintering in Egypt. "I ſhall paſs (ſays he) the cold months in Burgundy, where I wiſh you would look out ſome

little place for me." Buonaparte was to leave his devoted followers to moulder away in the undisturbed possession of Egypt, and under some plausible pretence to return to Europe with his ablest officers, and with, perhaps, a handful of the most ductile and tractable of his troops.

This plan, and no other, accounts for his keeping the fleet on the coast, in spite of the remonstrances of Brueys, and the evident danger to which it was exposed—it was to carry back the "Conqueror of Egypt" in triumph to France, and the admiral, who was wholly unacquainted with his design, fell a sacrifice at last to a perfidy which he could not comprehend.

Extract of a Letter from Adjutant-general Boyer, to General Kilmaine, dated Grand Cairo, July 28, 1798.

"Our entrance into Grand Cairo will doubtless excite that sensation at home, which every extraordinary event is calculated to produce; but, when you come to know the kind of enemy we had to combat, the little art they employed against us, and the perfect nullity of all their measures, our expedition and our victories will appear to you very common things.

We began by making an assault upon a place without any defence, and garrisoned by about 500 Janizaries, of whom scarce a man knew how to level a musket. I allude to Alexandria, a huge and wretched skeleton of a place, open on every side, and most certainly very unable to resist the efforts of 25,000 men, who attacked it at the same instant. We lost, notwithstanding, 150 men, whom we might have preserved by only summoning the town—but it was thought necessary to begin by striking terror into the enemy.

After this we marched against the Mamelucks, a people highly celebrated amongst the Egyptians for their bravery. This rabble (I cannot call them soldiers), who has not the most trifling idea of tactics, and know nothing of war but the blood that is spilt in it, appeared for the first time opposed to our army on the 13th of July. From the first dawn of day, they made a general display of their forces, which struggled round and round our army like so many cattle; sometimes gallopping, and sometimes pacing in groups of 10, 50, 100, &c. After some time, they made several attempts, in a style equally ridiculous and curious, to break in upon us; but, finding every where a resistance which they probably did not expect, they spent the day in keeping us exposed to the fury of a burning sun. Had we been a little more enterprizing this day, I think their fate would have been decided; but General Buonaparte temporized, that he might make a trial of his enemy, and become acquainted with their manner of fighting. The day ended with the retreat of the Mamelucks, who scarcely lost 25 men. We continued our march up the Nile till the 21st, which was the day that put a final termination to the power of the Mamelucks in Egypt. I should be familiar with the language of the country, and, what is of still more importance, in the confidence of the great, to be enabled to give you an idea of the resources found in this city; but, from the complaints I hear, and the demands of several generals who wish to return, I can easily perceive that there are vast discontents in the army. Generally speaking, it is hardly possible to conceive the miseries endured by the army during its 17 days' march; finding no where a bit of bread,

bread, nor a drop of wine, we were reduced to live on melons, gourds, poultry, buffalo-meat, and Nile-water.

Such, my general, is the succinct account of our operations. There is a talk already of our ascending the Nile as far as the cataracts: an expedition that will make a number of officers throw up their commissions."

In this correspondence there are two confidential letters from Rear-admiral Genteaume to the minister of the marine in France, giving an account of the glorious battle off Aboukir. He was on board l'Orient during the engagement. These letters are the more interesting, as they elucidate two very important points.—The first proves that Buonaparte acted the part of a villain in having endeavoured to injure the reputation of Admiral Brueys, and to insult his ashes. Buonaparte had asserted, that this unfortunate admiral detained the French fleet on the coast of Egypt contrary to his wishes; and, in this letter, Genteaume commander in chief of all the French naval forces in Egypt, proves that Brueys only remained on the coast because Buonaparte would not permit him to depart!—The second proves that the assertion made in the French papers, and re-echoed in some of our patriotic prints, that the fate of the day was undecided until the Orient took fire, is false. Besides, the authentic and irrefragable testimony of Admiral Genteaume, that the van of the French fleet was in our possession before the event took place, we have also the express authority of Capt. Berry for saying, that six of their ships had struck before the Orient was perceived to be on fire; and that not only he, but every officer who was in a situation of judging, is persuaded that the Orient herself had previously struck to the British flag.

Nov. 17, 1798. General Buonaparte, having been made acquainted with the intentions of the Arab chief, Mourad Bey, who was marching towards Cairo with very considerable forces to attack him, summoned a council of war, to which some of the leading men among the natives, who professed friendship to his views, as well as all the superior officers of his own army were invited to attend, in order to consider of the best means of defending the country, and of levying new impositions on the inhabitants to pay the troops.

Buonaparte having opened the business of the meeting, a native of Tripoli, who was present, drew a pistol and shot Buonaparte dead on the spot. The native officers followed the example of the Tripoline, by falling on the other French officers, all of whom were put to death. This proceeding was the signal for a general massacre of the French who were at Cairo.

The above intelligence seems to form the conclusion of our article; which, though not confirmed by any official advices, certainly has not as yet been officially contradicted. If any thing further, worthy the notice of our readers, should occur on the subject, we shall give it in a future number.

PHENOMENA OF CONGELATION.

WATER and other fluids are capable of containing the element of fire or heat in two very different states. In the one, they seem to imbibe the fire in such a manner, that it eludes all the methods

thods by which we are accuſtomed to obſerve it, either by our ſenſation of feeling, or the thermometer; in the other, it manifeſts itſelf obviouſly to our ſenſes, either by the touch, the thermometer, or the emiſſion of light.

In the firſt of theſe ſtates, we call the body *cold*; and are apt to ſay that this coldneſs is occaſioned by the abſence of heat. But this manner of expreſſing ourſelves is certainly improper; for even thoſe fluids which are coldeſt to the touch contain a vaſt deal of heat. This vapour, which is colder to the touch than the water from which it was raiſed, contains an immenſe quantity of fire, even more than ſufficient to heat it red hot. The like may be ſaid of common ſalt, and ſnow, or ice. If a quantity of theſe ſubſtances is ſeparately reduced to the degree of 28 or 30 of Fahrenheit's thermometer, upon mixing them together, the heat which would have raiſed the thermometer to the degree above mentioned now enters into the ſubſtance of them in ſuch a manner that the mercury falls downs to 0. Here an exceſſive degree of cold is produced, and yet we are ſure that the ſubſtances contain the very ſame quantity of heat that they formerly did: nay, they will even ſeem exceedingly cold, when they moſt certainly contain a great deal more heat than they originally did; for they abſorb it from all bodies around them; and, if a ſmall veſſel full of water is put in the middle of ſuch a mixture, it will in a ſhort time be full of ice.

It appears, therefore, that our ſenſes, even when aſſiſted by thermometers, can only judge of the ſtate in which the element of fire is with relation to the bodies around us, without regard to the quantity contained in them. Thus, if heat flows from any part of our body into any ſubſtance actually in contact with it, the ſenſation of cold is excited, and we call that ſubſtance *cold*; but if it flows from any ſubſtance into our body, the ſenſation of heat is excited, and we call that ſubſtance *hot*, without regard to the abſolute quantity contained in either caſe.

Of all known ſubſtances, the atmoſphere either abſorbs or throws out heat with the moſt remarkable facility: and in one or other of theſe ſtates it always is with reſpect to the ſurface of the earth, and ſuch bodies as are placed on or near it; for theſe, properly ſpeaking, have no temperature of their own, but are entirely regulated by that of the atmoſphere.—When the air has been for ſome time abſorbing the heat from terreſtrial bodies, a froſt muſt be the undoubted conſequence, for the ſame reaſon that water freezes in a veſſel put into a freezing mixture; and, were this abſorption to continue for a length of time, the whole earth would be converted into a frozen maſs. There, are, however, certain powers in nature, by which this effect is always prevented; and the moſt violent froſt we can imagine muſt always as it were defeat its own purpoſes, and end in a thaw. To underſtand this ſubject, we muſt obſerve,

1. In that ſtate of the atmoſphere which we denominate froſt, there is a moſt intimate union between the air and the water it contains; and therefore froſty weather, except in very high latitudes, is generally clear.

2. When ſuch an union takes place, either in winter or ſummer, we obſerve the atmoſphere alſo inclined to abſorb heat, and conſequently to froſt. Thus in clear ſettled weather, even in ſummer,

mer, though the day may be exceſſively hot by reaſon of the continued ſunſhine, yet the mornings and evenings are remarkably cold, and ſometimes even diſagreeably ſo.

3. The air being therefore always ready in the time of froſt, or in clear weather, to abſorb heat from every ſubſtance which comes into contact with it, it follows that it muſt alſo abſorb part of that which belongs to the vapours contained in it.

4. Though vapour is capable of becoming much colder than water without being frozen, yet by a continued abſorption it muſt at laſt part with its latent heat, i. e. that which eſſentially conſtitutes it vapour; and without which it is no longer vapour, but water or ice. No ſooner, therefore, does the froſt arrive at a certain pitch, than the vapours, every where diſperſed through the air, give out their latent heat: the atmoſphere then becomes clouded; the froſt either totally goes off, or becomes milder by reaſon of the great quantity of heat diſcharged into the air; and the vapours deſcend in rain, hail, or ſnow, according to the particular diſpoſition of the atmoſphere at the time.

5. Even in the polar regions, where it may be thought that the froſt muſt increaſe beyond meaſure, there are alſo natural means for preventing its running to extremes. The principal cauſe here is, the mixture of a great quantity of vapours from the more temperate regions of the globe with the air in thoſe dreary climates. It is well known, that aqueous vapour always flies from a warm to a colder place. For this reaſon, the vapours raiſed by the ſun in the more temperate regions of the earth, muſt continually travel northward and ſouthward in great quantities. Thus they furniſh materials for thoſe immenſe quantities of ſnow and ice which are to be found in the neighbourhood of the poles, and which we cannot imagine the weak influence of the ſun in theſe parts capable of raiſing. It is impoſſible that a quantity of vapour can be mixed with froſty air, without communicating a great deal of heat to it: and thus there are often thaws of conſiderable duration even in thoſe climates where, from the little influence of the ſun, we ſhould ſuppoſe the froſt would be perpetual.

6. We may now account with ſome probability for the uncertain duration of froſts. In this country they are ſeldom of a long continuance; becauſe the vapours raiſed from the ſea with which our iſland is ſurrounded, perpetually mix with the air over the iſland, and prevent a long duration of the froſt. For the ſame reaſon, froſts are never of ſuch long duration in maritime places on the continent as in the inland ones. There is nothing, however, more uncertain than the motion of the vapours with which the air is conſtantly filled; and therefore it is impoſſible to prognoſticate the duration of a froſt with any degree of certainty. In general, we may always be certain, that, if a quantity of vapour is accumulated in any place, no intenſe froſt can ſubſiſt in that place for any length of time; and, by whatever cauſes the vapours are driven from place to place, by the ſame cauſes the froſts are regulated throughout the whole world.

In the northern parts of the world, even ſolid bodies are liable to be affected by froſt. Timber is often apparently frozen, and rendered exceedingly difficult to ſaw. Marl, chalk, and other leſs ſolid terreſtrial concretions, will be ſhattered by ſtrong and durable froſts.

frosts. Metals are contracted by frost: thus, an iron tube, 12 feet long, upon being exposed to the air in a frosty night, lost two lines of its length. On the contrary, frost swells or dilates water near one-tenth of its bulk. Mr. Boyle made several experiments with metalline vessels, exceedingly thick and strong; which being filled with water, close stopped, and exposed to the cold, burst by the expansion of the frozen fluid within them. Trees are frequently destroyed by frost, as if burnt up by the most excessive heat; and in very strong frosts, walnut-trees, ashes, and even oaks, are sometimes split and cleft, so as to be seen through, and this with a terrible noise, like the explosion of fire-arms.

Frost naturally proceeds from the upper parts of bodies downwards: but how deep it will reach in earth or water, is not easily known; because this depth may vary with the degree of coldness in the air, by a longer or shorter duration of the frost, the texture of the earth, the nature of the juices wherewith it is impregnated, the constitution of its more internal parts as to heat and cold, the nature of its effluvia, &c. Mr. Boyle, in order to ascertain this depth, after four nights of hard frost, dug in an orchard, where the ground was level and bare, and found the frost had scarcely reached three inches and a half, and in a garden nearer the house only two inches below the surface. Nine or ten successive frosty nights froze the bare ground in the garden six inches and a half deep; and in the orchard, where a wall sheltered it from the south sun, to the depth of eight inches and a half. He also dug in an orchard, near a wall, about a week afterwards, and found the frost to have penetrated to the depth of 14 inches. In a garden at Moscow, the frost in a hard season only penetrates to two feet: and the utmost effect that Captain James mentions the cold to have had upon the ground of Charlton island, was to freeze it to 10 feet deep: whence may appear the different degrees of cold of that island and Russia. And, as to the freezing of water at the abovementioned island, the captain tells us, it does not naturally congeal above the depth of six feet, the rest being by accident. Water also, exposed to the cold air in large vessels, always freezes first at the upper surface, the ice gradually increasing and thickening downwards: for which reason, frogs retire in frosty weather to the bottom of ditches; and it is said that shoals of fish retire in winter to those depths of the seas and rivers where they are not to be found in summer. Water, like the earth, seems not disposed to receive any very intense degree of cold at a considerable depth or distance from the air. The vast masses of ice found in the northern seas, being only many flakes and fragments, which, sliding under each other, are, by the congelation of the intercepted water, cemented together.

In cold countries, the frost often proves fatal to mankind; not only producing gangrenes, but even death itself. Those who die of it have their hands and feet first seized, till they grow past feeling it; after which the rest of their bodies is so invaded, that they are taken with a drowsiness, which, if indulged, they awake no more, but die insensibly. But there is another way whereby it proves mortal, viz by freezing the abdomen and viscera, which on dissection are found to be mortified and black

The great power of frost on vegetables is a thing sufficiently known; but the differences between the frosts of a severe winter and

and thofe which happen in the fpring mornings, in their effects on plants and trees, were never perfectly explained, till by Meff. Du Hamel and Buffon in the memoirs of the Paris Academy.

The frofts of fevere winters are much more terrible than thofe of the fpring, as they bring on a privation of all the products of the tenderer part of the vegetable world; but then they are not frequent, fuch winters happening perhaps but once in an age; and the frofts of the fpring are in reality greater injuries to us than thefe, as they are every year repeated.

In regard to trees, the great difference is this, that the frofts of fevere winters affect even their wood, their trunks, and large branches; whereas thofe of the fpring have only power to hurt the buds. The winter froft happening at a time when moft of the trees in our woods and gardens have neither leaves, flowers, nor fruits, upon them, and have their buds fo hard as to be proof againft flight injuries of weather, efpecially if the preceding fummer has not been too wet; in this ftate, if there are no unlucky circumftances attending, the generality of trees bear moderate winters very well; but hard frofts, which happen late in the winter, caufe very great injuries even to thofe trees which they do not utterly deftroy. Thefe are, 1. Long cracks following the direction of the fibres. 2. Parcels of dead wood inclofed round with wood yet in a living ftate. And, 3. That diftemperature which the forefters call the *double blea*, which is a perfect circle of blea, or foft white wood, which, when the tree is afterwards felled, is found covered by a circle of hard and folid wood.—The opinions of authors about the expofition of trees to the different quarters, have been very different, and moft of them grounded on no rational foundation. Many are of opinion that the effects of froft are moft violently felt on thofe trees which which are expofed to the north; and others think the fouth or the weft are moft ftrongly affected by them. There is no doubt but the north expofure is fubject to the greateft cold. It does not, however, follow from this, that the injury muft be always greateft on the trees expofed to the north in frofts: on the contrary, there are abundant proofs that it is on the fouth fide that trees are generally more injured by froft: and it is plain from repeated experiments, that there are particular accidents, under which a more moderate froft may do more injury to vegetables, than the moft fevere one which happens to them under more favourable circumftances.

It is plain from the accounts of the injuries trees received by the frofts in 1709, that the greateft of all were owing to repeated falfe thaws, fucceeded by repeated new frofts. But the frofts of the fpring-feafon furnifh abundantly more numerous examples of this truth; and fome experiments made by the Count de Buffon, at large in his own woods, prove inconteftably, that it is not the fevereft cold or moft fixed froft that does the greateft injury to vegetables.

This is an obfervation directly oppofite to the common opinion; yet is not the lefs true, nor is it any way difcordant to reafon. We find by a number of experiments, that humidity is the thing that makes froft fatal to vegetables; and therefore every thing that can occafion humidity in them, expofes them to thefe injuries, and every thing that can prevent or take off an over proportion of humidity in them, every thing that can dry them though with ever fo increafed a cold, muft prevent or preferve them from thofe injuries. Numerous

experiments and obſervations tend to prove this. It is well known that vegetables always feel the froſt very deſperately in low places where there are fogs. The plants which ſtand by a river ſide are frequently found deſtroyed by the ſpring and autumnal froſts, while thoſe of the ſame ſpecies, which ſtand in a drier place, ſuffer little or perhaps not at all by them; and the low and wet parts of foreſts are well known to produce worſe wood than the high and drier. The coppice wood in wet and low parts of common woods, though it puſh out more vigorouſly at firſt than that of other places, yet never comes to ſo good a growth; for the froſt of the ſpring, killing theſe early top-ſhoots, obliges the lower part of the trees to throw out lateral branches: and the ſame thing happens in a greater or ſmaller degree to the coppice wood that grows under cover of larger trees in great foreſts; for here the vapours, not being carried off either by the ſun or wind, ſtagnate and freeze, and in the ſame manner deſtroy the young ſhoots, as the fogs of marſhy places. It is a general obſervation alſo, that the froſt is never hurtful to the late ſhoots of the vine, or to the flower-buds of trees, except when it follows heavy dews, or a long rainy ſeaſon, and then it never fails to do great miſchief, though it be ever ſo ſlight.

The froſt is always obſerved to be more miſchievous in its conſequences on newly cultivated ground than in other places; and this is becauſe the vapours which continually ariſe from the earth, find an eaſier paſſage from thoſe places than from others. Trees alſo which have been newly cut, ſuffer more than others by the ſpring froſts, which is owing to their ſhooting out more vigorouſly.

Froſts alſo do more damage on light and ſandy grounds, than on the tougher and firmer ſoils, ſuppoſing both equally dry; and this ſeems partly owing to their being more early in their productions, and partly to their lax texture ſuffering a greater quantity of vapours to tranſpire.

It alſo has been frequently obſerved, that the ſide-ſhoots of trees are more ſubject to periſh by the ſpring froſts than thoſe from the top; and M. Buffon, who examined into this with great accuracy, always found the effects of the ſpring froſts much greater near the ground than elſewhere. The ſhoots within a foot of the ground quickly periſhed by them; thoſe which ſtood at two or three feet high, bore them much better; and thoſe at four feet and upwards frequently remained wholly unhurt, while the lower ones were entirely deſtroyed.

There is a ſeries of obſervations, which have proved beyond all doubt, that it is not the hard froſts which ſo much hurt plants, as thoſe froſts, though leſs ſevere, which happen when they are full of moiſture; and this clearly explains the account of all the great damages done by the ſevere froſts being on the ſouth ſide of the trees which are affected by them, though that ſide has been plainly all the while leſs cold than the north. Great damage is alſo done to the weſtern ſides of trees and plantations, when after a rain with a weſt wind the wind turns about to the north at ſun-ſet, as is frequently the caſe in ſpring, or when an eaſt wind blows upon a thick fog before ſun-riſing.

Dr. Blagden (Phil. Tranſ. vol. lxxiii.) obſerves, that it was not till near the year 1730, that thermometers were made with any degree of accuracy; and in four or five years after this, the firſt obſervations

obſervations were made which prove the freezing of quickſilver. On the acceſſion of the Empreſs Anne Ivanouna to the throne of Ruſſia, three profeſſors of the Imperial academy were choſen to explore and deſcribe the different parts of her Aſiatic dominions, and to inquire into the communication betwixt Aſia and America. Theſe were Dr. John George Gmelin, in the department of natural hiſtory and chemiſtry; M. Gerard Frederic Muller, as general hiſtoriographer; and M. Louis de l'Iſle de la Croyere, for the department of aſtronomy; draughtſmen and other proper aſſiſtants being appointed to attend them. They departed from Peterſburgh in 1733; and ſuch as ſurvived did not return till ten years after. The thermometrical obſervations were communicated by Profeſſor Gmelin, who firſt publiſhed them in his Flora Sibirica, and afterwards more fully in the Journal of his Travels. An abſtract of them was likewiſe inſerted in the Peterſburg Commentaries for the years 1756 and 1765, taken, after the profeſſor's death, from his original diſpatches in poſſeſſion of the Imperial academy.

In the winter of 1734 and 1735, Mr. Gmelin being at Yeneſeiſk, in 58½ N. lat. and 92 E. lon. from Greenwich, firſt obſerved ſuch a deſcent of the mercury, as we know muſt have been attended with congelation. "Here (ſays he) we firſt experienced the truth of what various travellers have related with reſpect to the extreme cold of Siberia; for, about the middle of December, ſuch ſevere weather ſet in, as we were ſure had never been known in our time at Peterſburg. The air ſeemed as if it were frozen, with the appearance of a fog, which did not ſuffer the ſmoke to aſcend as it iſſued from the chimnies. Birds fell down out of the air as dead, and froze immediately, unleſs they were brought into a warm room. Whenever the door was opened, a fog ſuddenly formed round it. During the day, ſhort as it was, parhelia and haloes round the ſun were frequently ſeen; and in the night mock moons, and haloes about the moon. Finally, our thermometer, not ſubject to the ſame deception as the ſenſes, left us no doubt of the exceſſive cold; for the quickſilver in it was reduced, on the 5th of January O. S. to —120° of Fahrenheit's ſcale, lower than it had ever hitherto been obſerved in nature."

The next inſtance of congelation happened at Yakutſk, in N. lat. 62. and E. lon. 130. The weather here was unuſually mild for the climate, yet the thermometer fell to —72°; and one perſon informed the profeſſor by a note, that the mercury in his barometer was frozen. He haſtened immediately to his houſe to behold ſuch a ſurpriſing phenomenon; but, though he was witneſs to the fact, the prejudice he entertained againſt the poſſibility of the congelation would not allow him to believe it. "Not feeling (ſays he), by the way, the ſame effects of cold as I had experienced at other times in leſs diſtances, I began, before my arrival, to entertain ſuſpicions about the congelation of his quickſilver. In fact, I ſaw that it did not continue in one column, but was divided in different places as into little cylinders, which appeared frozen; and, in ſome of theſe diviſions between the quickſilver, I perceived like the appearance of frozen moiſture. It immediately occurred to me, that the mercury might have been cleaned with vinegar and ſalt, and not ſufficiently dried. The perſon acknowledged it had been purified in that manner. This ſame quickſilver, taken out of the barometer, and well

 dried,

dried, would not freeze again, though expoſed to a much greater degree of cold, as ſhewn by the thermometer."

Another ſet of obſervations, in the courſe of which the mercury frequently congealed, were made by Profeſſor Gmelin at Kirenga fort, in 57½ N. lat. 108 E. lon. his thermometer, at different times, ſtanding at —108°, —86°, —100°, —113°, and many other intermediate degrees. This happened in the winter of 1737 and 1738. On the 27th of November, after the thermometer had been ſtanding for two days at —46°, he found it ſunk at noon to 108°. Suſpecting ſome miſtake, after he had noted down the obſervation, he inſtantly ran back, and found it at 102°; but aſcending with ſuch rapidity, that in the ſpace of half an hour it had riſen to —19°. This phenomenon, which appeared ſo ſurpriſing, undoubtedly depended on the expanſion of the mercury frozen in the bulb of the thermometer, and which now melting, forced upwards the ſmall thread in the ſtem.

A ſimilar appearance was obſerved at the ſame fort a few days after; and on the 29th of December, O. S. he found the mercury, which had been ſtanding at —40° in the morning, ſunk to —100° at four in the afternoon. At this time, he ſays, he "ſaw ſome air in the thermometer ſeparating the quickſilver for the ſpace of about ſix degrees." He had taken notice of a ſimilar appearance the preceding evening, excepting that the *air*, as he ſuppoſed it to be, was not then collected into one place, but lay ſcattered in ſeveral.

Theſe appearances undoubtedly proceeded from a congelation of the mercury, though the prejudice entertained againſt the poſſibility of this phenomenon would not allow the profeſſor even to inquire into it at all. Several other obſervations were made; ſome of which were loſt, and the reſt contain no farther information.

The ſecond inſtance where a natural congelation of mercury has certainly been obſerved, is recorded in the Tranſactions of the Royal Academy of Sciences at Stockholm. The weather, in January 1760, was remarkably cold in Lapland; ſo that, on the 5th of that month, the thermometers fell to —76°, —128°, or lower; on the 23d and following days they fell to —58°, —79°, —92° and below —238° entirely into the ball. This was obſerved at Tornea, Sombio, Jakaſierf, and Utſioki, four places in Lapland, ſituated between the 65th and 78th degrees of N. lat. and the 21ſt and 28th of E. lon. The perſon who obſerved them was M. Andrew Hellant, who makes the following remarks, of themſelves ſufficient to ſhew that the quickſilver was frozen. "During the cold weather at Sombio (ſays he), as it was clear ſunſhine, though ſcarcely the whole body of the ſun appeared above the low woods that covered our horizon, I took a thermometer which was hanging before in the ſhade, and expoſed it to the riſing ſun about eleven in the forenoon, to ſee whether, when that luminary was ſo low, it would have any effect upon the inſtrument. But to my great ſurpriſe, upon looking at it about noon, I found that the mercury had entirely ſubſided into the ball, though it was ſtanding as high as —61° at eleven o'clock, and the ſcale reached down to 238° below 0." On bringing the inſtrument near a fire, it preſently roſe to its uſual height; and the reaſon of its ſubſiding before was its being ſomewhat warmed by the rays of the ſun; which, feeble as they were, had yet ſufficient power to melt the ſmall thread of congealed mercury in the ſtem of the thermometer, and allow it to ſubſide along with the reſt. Mr. Hellant, however, ſo little underſtood

ſtood the reaſon of this phenomenon, that he frequently attempted to repeat it by bringing the thermometer near a fire, when the cold was only a few degrees below the freezing point of water, but could never ſucceed until it fell to —58°, or lower, that is, until the cold was ſufficiently intenſe to congeal the metal. The only ſeeming difficulty in his whole account is, that, when the mercury had ſubſided entirely into the ball of the thermometer, a vacuum or empty ſpot appeared, which ran round the cavity like an air bubble, on turning the inſtrument; but this proceeded from a partial liquefaction of the mercury, which muſt neceſſarily melt firſt on the outſide, and thus exhibit the appearance juſt mentioned.

The moſt remarkable congelation of mercury, which has ever yet been obſerved, was that related by Dr. Peter Simon Pallas, who had been ſent by the Empreſs of Ruſſia, with ſome other gentlemen, on an expedition ſimilar to that of Dr. Gmelin. He did not, however, ſpend the winters in which he was in Siberia in the coldeſt parts of that country; that is, about the middle of the northern part. Twice indeed he reſided at Kraſnoyarſk, in N. lat. 56½, E. lon. 93; where, in the year 1772, he had an opportunity of obſerving the phenomenon we ſpeak of. "The winter (ſays he) ſet in early this year, and was felt with uncommon ſeverity in December. On the 6th and 7th of that month happened the greateſt cold I have ever experienced in Siberia; the air was calm at the time, and ſeemingly thickened; ſo that, though the ſky was in other reſpects clear, the ſun appeared as through a fog. I had only one ſmall thermometer left, in which the ſcale went no lower than —7°; and on the 6th in the morning, I remarked that the quickſilver in it ſunk into the ball, except ſome ſmall columns which ſtuck faſt in the tube.—When the ball of the thermometer, as it hung in the open air, was warmed by being touched with the finger, the quickſilver roſe; and it could plainly be ſeen, that the ſolid columns ſtuck and reſiſted a good while, and were at length puſhed upward with a ſort of violence. In the mean time I placed upon the gallery, on the north ſide of my houſe, about a quarter of a pound of clean and dry quickſilver in an open bowl. Within an hour I found the edges and ſurface of it frozen ſolid, and ſome minutes afterwards the whole was condenſed by the natural cold into a ſoft maſs very much like tin. While the inner part was ſtill fluid, the frozen ſurface exhibited a great variety of branched wrinkles; but in general it remained pretty ſmooth in freezing, as did alſo a larger quantity which I afterwards expoſed to the cold. The congealed mercury was more flexible than lead; but, on being bent ſhort, it was found more brittle than tin; and, when hammered out thin, it ſeemed ſomewhat granulated. If the hammer had not been perfectly cooled, the quickſilver melted away under it in drops; and the ſame thing happened when the metal was touched with the finger, by which alſo the finger was immediately benumbed. In our warm room it thawed on its ſurface gradually, by drops, like wax on the fire, and did not melt all at once. When the frozen maſs was broken to pieces in the cold, the fragments adhered to each other and to the bowl on which they lay. Although the froſt ſeemed to abate a little towards night, yet the congealed quickſilver remained unaltered, and the experiment with the thermometer could ſtill be repeated. On the 7th of December, I had an opportunity of making the ſame obſervations all day; but ſome hours after ſunſet,

fet, a north-weft wind fprung up, which raifed the thermometer to —46°, when the mafs of quickfilver began to melt."

In the beginning of the year 1780, M. Von Elterlein, of Vytegra, a town of Ruffia, in lat. 61. E. lon. 36 froze quickfilver by natural cold; of which he gives the following account. "On the 4th of January 1780, the cold having increafed to —34 that evening at Vytegra, I expofed to the open air three ounces of very pure quickfilver in a china tea-cup, covered with paper, pierced full of holes. Next day, at eight in the morning, I found it folid, and looking like a piece of caft lead, with a confiderable depreffion in the middle. On attempting to loofen it in the cup, my knife raifed fhavings from it as if it had been lead, which remained fticking up; and at length the metal feparated from the bottom of the cup in one mafs. I then took it in my hand to try if it would bend: it was ftiff like glue, and broke into two pieces; but my fingers immediately loft all feeling, and could fcarcely be reftored in an hour and an half by rubbing with fnow. At eight o'clock a thermometer, made by Mr. Lexmann of the academy, ftood at —57°; by half after nine it was rifen to —40°; and then the two pieces of mercury which lay in the cup had loft fo much of their hardnefs, that they could no longer be broken, or cut into fhavings, but refembled a thick amalgam, which, though it became fluid when preffed by the fingers, immediately afterwards refumed the confiftence of pap. With the thermometer at —39°, the quickfilver became fluid. The cold was never lefs on the 5th than —28°, and by nine in the evening it had increafed again to —33°."

An inftance of the natural congelation of quickfilver alfo occurred in Jemtland, one of the provinces of Sweden, on the 1ft of January 1782; and laftly, on the 26th of the fame month, Mr. Hutchins obferved the fame effect of the cold at Hudfon's bay. "The fubject of this curious phenomenon (fays he), was quickfilver put into a common two-ounce vial, and corked. The vial was about a third part full, and had conftantly been ftanding by the thermometer for a month paft. At eight o'clock this morning I obferved it was frozen rather more than a quarter of an inch thick round the fides and bottom of the vial, the middle part continuing fluid. As this was a certain method of finding the point of congelation, I introduced a mercurial and a fpirit thermometer into the fluid part, after breaking off the top of the vial, and they rofe directly and became ftationary; the former at 40° or 40½°, the latter at 29¾°, both below the cypher. Having taken thefe out, I put in two others, a mercurial one formerly defcribed, and a fpirit thermometer; the former of which became ftationary at 40 and the latter at 30°. I then decanted the fluid quickfilver, to examine the internal furface of the frozen metal; which proved very uneven, with many radii going acrofs, fome of which refembled pin-heads. Urgent bufinefs called me away an hour. On my return I found a fmall portion only had liquefied in my abfence. I then broke the vial entirely, and with a hammer repeatedly ftruck the quickfilver. It beat out flat, yielded a deadifh found, and became fluid in lefs than a minute afterwards. —It may be worth remarking, that the quickfilver in one of the thermometers, which had funk to very near 500, and was then at 444, very readily ran up and down the tube by elevating either end of the inftrument."

Thefe

Thefe are all the well authenticated accounts of the congelation of mercury by the natural cold of the atmofphere. Some others have been publifhed; but being either lefs important, or not fo well authenticated, we forbear to mention them. On Mr. Hutchins's experiment, and on congelation in general, Mr. Cavendifh makes many valuable remarks: the fubftance of which is as follows:

"If a veffel of water, with a thermometer in it, be expofed to the cold, the thermometer will fink feveral degrees below the freezing point, efpecially if the water be covered up fo as to be defended from the wind, and care taken not to agitate it; and then in dropping in a bit of ice, or on mere agitation, fpiculæ of ice fhoot fuddenly through the water, and the inclofed thermometer rifes quickly to the freezing point, where it remains ftationary." In a note he fays, that though in conformity to the common opinion he has allowed that "mere agitation may fet the water a freezing, yet fome experiments lately made by Dr. Blagden feem to fhew, that it has not much, if any, effect of that kind, otherwife than by bringing the water in contact with fome fubftance colder than itfelf. Though in general alfo the ice fhoots rapidly, and the inclofed thermometer rifes very quick; yet he once obferved it to rife very flowly, taking up not lefs than half a minute, before it afcended to the freezing point; but in this experiment the water was cooled not more than one or two degrees below freezing; and it fhould feem, that the more the water is cooled below the freezing point, the more rapidly the ice fhoots and the inclofed thermometer rifes."

Mr. Cavendifh then obferves, "that from the foregoing experiments we learn that water is capable of being cooled confiderably below the freezing point, without any congelation taking place; and that, as foon as by any means a fmall part of it is made to freeze, the ice fpreads rapidly through the whole of the water. The caufe of this rife of the thermometer is, that all or almoft all bodies, by changing from a fluid to a folid ftate, or from the ftate of an elaftic to that of an unelaftic fluid, generate heat; and that cold is produced by the contrary procefs. Thus all the circumftances of the phenomenon may be perfectly well explained; for, as foon as any part of the water freezes, heat will be generated thereby in confequence of the above-mentioned law, fo that the new formed ice and remaining water will be warmed, and muft continue to receive heat by the freezing of frefh portions of water, till it is heated exactly to the freezing point, unlefs the water could become quite folid before a fufficient quantity of heat was generated to raife it to that point, which is not the cafe: and it is evident, that it cannot be heated above the freezing point; for, as foon as it comes thereto, no more water will freeze, and confequently no more heat will be generated.—The reafon why the ice fpreads all over the water, inftead of forming a folid lump in one part, is, that, as foon as any fmall portion of ice is formed, the water in contact with it will be fo much warmed as to be prevented from freezing, but the water at a little diftance from it will ftill be below the freezing point, and will confequently begin to freeze.

"Were it not for this generation of heat, the whole of any quantity of water would freeze as foon as the procefs of congelation began; and in like manner the cold is generated by the melting of ice; which is the caufe of the long time required to thaw ice and fnow.

ſnow. It was formerly found that, by adding ſnow to warm water, and ſtirring it about until all was melted, the water was as much cooled as it would have been by the addition of the ſame quantity of water rather more than 150° degrees colder than the ſnow; or, in other words, ſomewhat more than 150° of cold are generated by the thawing of the ſnow; and there is great reaſon to believe that juſt as much heat is produced by the freezing of water. The cold generated in the experiment juſt-mentioned was the ſame whether ice or ſnow was uſed.

"A thermometer, kept in melted tin or lead till they become ſolid, remains perfectly ſtationary from the time the metal begins to harden round the ſides of the pot till it is entirely ſolid; but it cannot be perceived at all to ſink below that point, and riſe up to it when the metal begins to harden. It is not unlikely, however, that the great difference of heat between the air and melted metal might prevent this effect from taking place; ſo that, though it was not perceived in theſe experiments, it is not unlikely that thoſe metals, as well as water and quickſilver, may bear being cooled a little below the freezing or hardening point (for the hardening of melted metals, and freezing of water, ſeems exactly the ſame proceſs), without beginning to loſe their fluidity.

"The experiments of Mr. Hutchins prove, that quickſilver contracts or diminiſhes in bulk by freezing; and that the very low degrees to which the thermometers have been made to ſink, is owing to this contraction, and not to the cold having been in any degree equal to that ſhewn by the thermometer. In the fourth experiment, one of the thermometers ſunk to 450°, though it appeared, by the ſpirit thermometer, that the cold of the mixture was not more than five or ſix degrees below the point of freezing quickſilver. In the firſt experiment alſo, it ſunk to 448°, at a time when the cold of the mixture was only 2½° below that point; ſo that, it appears, that the contraction of quickſilver by freezing muſt be at leaſt equal to its expanſion by 404 degrees of heat. This, however, is not the whole contraction that it ſuffers; for it appears by an extract from a meteorological journal kept by Mr. Hutchins at Albany fort, that his thermometer once ſunk to 490° below 0; though it was known by a ſpirit thermometer, that the cold ſcarcely exceeded the point of freezing quickſilver. There are two experiments alſo of Profeſſor Braun, in which the thermometer ſunk to 544 and 556° below nothing; which is the greateſt deſcent he ever obſerved without the ball being cracked. It is not indeed known how cold his mixtures were; but, from Mr. Hutchins's experiments, there is great reaſon to think they could not be many degrees below 40°. If ſo, the contraction which quickſilver ſuffers in freezing, is not much leſs than its expanſion by 500° or 510° of heat, that is, almoſt $\frac{1}{23}$ of its whole bulk; and in all probability is never much more than that, though it is probable that this contraction is not always determinate: for a conſiderable variation may frequently be obſerved in the ſpecific gravity of the ſame piece of metal caſt different times over; and almoſt all caſt metals become heavier by hammering. Mr. Cavendiſh obſerved, that, on caſting the ſame piece of tin three times over, its denſity varied from 7·252 to 7·294, though there was great reaſon to think that no hollows were left in it, and that only a ſmall part of this difference could proceed from the error of the experiment.

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This variation of denſity is as much as is produced in quickſilver by an alteration of 66° of heat; and it is not unlikely, that the deſcent of a thermometer, on account of the contraction of the quickſilver in its ball by freezing, may vary as much in different trials, though the whole maſs of quickſilver is frozen without any vacuities.

"The cold produced by mixing ſpirit of nitre with ſnow is entirely owing to the melting of the ſnow. Now, in all probability, there is a certain degree of cold in which the ſpirit of nitre, ſo far from diſſolving ſnow, will yield part of its own water, and ſuffer that to freeze, as is the caſe with ſolutions of common ſalt; ſo that, if the cold of the materials before mixing is equal to this, no additional cold can be produced. If the cold of the materials is leſs, ſome increaſe of cold will be produced; but the total cold will be leſs than in the former caſe, ſince the additional cold cannot be generated without ſome of the ſnow being diſſolved, and thereby weakening the acid, and making it leſs able to diſſolve more ſnow; but yet, the leſs the cold of the materials is, the greater will be the additional cold produced. This is conformable to Mr. Hutchins's experiments; for in the fifth experiment, in which the cold of the materials was —40°, the additional cold produced was only 5°. In the firſt experiment, in which the cold of the materials was only —23°, an addition of at leaſt 19° of cold was obtained; and by mixing ſome of the ſame ſpirit of nitre with ſnow in this climate, when the heat of the materials was +26°, Mr. Cavendiſh was able to ſink the thermometer to —29, ſo that an addition of 55° of cold was produced.

Acids, eſpecially thoſe of the mineral kind, powerfully reſiſt congelation. There is, however, a peculiarity with regard to that of vitriol. M. Chaptal, a foreign chemiſt, obſerved that it condenſed by the cold of the atmoſphere, and the cryſtals began to melt only at +70° of his thermometer; which, if Reaumur's, correſponds to about 47° of Fahrenheit. The cryſtals were unctuous from the melting acid, and they felt warmer than the neighbouring bodies: the form was that of a priſm of ſix ſides, flatted and terminated by a pyramid of ſix ſides; but the pyramid appeared on one end only; on the other, the cryſtal was loſt in the general maſs. The pyramid reſulted from an aſſemblage of ſix iſoſceles triangles: the oil when the cryſtal was melted was of yellowiſh black; on re-diſtilling it in a proper apparatus, no peculiar gas came over. M. Chaptal repeated his experiments with the highly concentrated acid, but found that it did not freeze; that the denſity of the acid which he thought froze moſt eaſily was to the oil, of the uſual ſtrength for ſale, as from 63 and 65 to 66; and the neceſſary degree of cold about 19 of Fahrenheit. Oil of vitriol once melted will not cryſtallize again with the ſame degree of cold.

M. Moré, a conſiderable manufacturer of oil of vitriol at Hadimont near Vervier, in the duchy of Limbourg in Germany, attributes this congelation to the addition of nitrous air. The acid of vitriol is uſually ſeparated from ſulphur by burning it in cloſe veſſels; and the air is ſupplied by adding to the ſulphur a little nitre. He found, that by mixing the acid, capable of being congealed, with water, or employing it for other purpoſes, orange-colured fumes, and the ſmell of the true nitrous acid, were very evident. When this gas was deſtroyed, no degree of cold would congeal the acid, whatever was its degree of concentration; and the congelation was ge-

nerally obſerved immediately after the proceſs by which the acid was obtained.

Mr. Macquer relates, in the ſecond edition of his Chemical Dictionary, article *Vitriolic Acid*, that the Duke d'Ayen had obſerved the congelation of concentrated vitriolic acid, which had been expoſed to a cold expreſſed by 13 or 14° below 0 on Reaumur's thermometer; but that mixtures, conſiſting of one part of the above-mentioned concentrated acid, with two or more parts of water, could not be frozen by the cold to which he expoſed them, till he had diluted the acid ſo much, that its denſity was to that of water as 104½ to 96; in which latter caſe of congelation it is probable that the water only was frozen, as is the caſe in dilute ſolutions of ſalts. Similar experiments were made by M. de Morveau, and with equal ſucceſs. Having produced an intenſe cold by pouring ſpirit of nitre on pounded ice, he congealed a part of ſome vitriolic acid which had been previouſly concentrated; but he obſerved, that, though a very intenſe cold had been made uſe of to congeal the acid at firſt, it nevertheleſs remained congealed in much ſmaller degrees of cold, and that it thawed very ſlowly. This coincides with the obſervations of M. Chaptal; though the latter obſerves, that there is ſome difference between ſtrong oil of vitriol lowered with water, and that produced of a given ſtrength by rectification. The latter always has ſome colour; and it will not diſſolve indigo in ſuch a manner as to carry the colour into the ſtuff, though the ſtronger oil, diluted to the ſame degree, ſucceeds very well. Some obſervations were alſo made by Mr. M'Nab at Hudſon's Bay, an account of which is given in the Phil. Tranſ. for 1786 by Mr. Cavendiſh, at whoſe deſire they had been made. From them it appears, that vitriolic acid, whoſe ſpecific gravity was to that of water as 1843 to 1000, froze when expoſed to a cold of —15° of Fahrenheit's ſcale: that another more dilute vitriolic acid, conſiſting of 629 parts of the former concentrated acid, and 351 parts of water, congealed in a temperature of —36°; and that, when farther diluted, it was capable of ſuſtaining a much greater degree of cold without freezing at all. In theſe experiments, as well as in thoſe of M. Morveau, it appeared, that the whole of the acid did not congeal, but that part of it retained its fluidity; and on examining the ſtrength of that which remained fluid, Mr. Cavendiſh found that there was very little difference between it and the other; whence he was led to ſuppoſe, that the reaſon of this congelation does not ariſe from any difference in ſtrength, but on ſome leſs obvious quality, and ſuch as conſtitutes the difference between common and icy oil of vitriol.

In all the experiments hitherto made, however, Mr. Cavendiſh had found ſome uncertainty in determining the point of eaſieſt freezing; neither could he determine whether the cold neceſſary for congelation does not increaſe without any limitation in proportion to the ſtrength of the acid. A new ſet of experiments were therefore made by Mr. Keir to determine this point. He had obſerved, after a ſevere froſt at the end of the year 1784 and beginning of 1785, that ſome vitriolic acid, contained in a corked phial, had congealed, while other bottles containing the ſame, ſome ſtronger and ſome weaker, retained their fluidity. As the congelation was naturally imputed to the extremity of the cold, he was afterwards ſurpriſed to find, when the froſt ceaſed, that the acid remained congealed for many days, when

when the temperature of the atmofphere was fometimes above 40° of Fahrenheit; and, when the congealed acid was brought into a warm room on purpofe to thaw it, a thermometer placed in contact with it during its thawing continued ftationary at 45°. Hence he concluded, that the freezing and thawing point of this acid was nearly at 45°; and accordingly, on expofing the liquor which had been thawed to the air at the temperature of 30°, the congelation again took place in a few hours. From the circumftance of other parcels of the fame acid, but of different ftrengths, remaining fluid, though they had been expofed to a much greater degree of cold, he was led to believe that there muft be fome certain ftrength at which the acid is more difpofed to congeal than at any other. The fpecific gravity of the acid which had frozen was to that of water nearly as 1800 to 1000, and that of the ftronger acid which had not frozen was as 1846 to 1000, which is the common denfity of that ufually fold in England; and there was not the leaft difference, excepting in point of ftrength, between the acid which had frozen and that which had not; Mr. Keir having taken the acid fome weeks before with his own hands from the bottle which contained the latter, and diluted it with water, till it became of the fpecific gravity of 1800.

To render the experiment complete, Mr. Keir immerfed feveral acids of different ftrengths in melting fnow, inftead of expofing them to the air; the temperature of which was varaible, whereas that of melting fnow was certain and invariable. Thofe which would not freeze in melting fnow were afterwards immerfed in a mixture of common falt, fnow, and water; the temperature of which, though not fo conftant and determinate as that of melting fnow, generally remained for feveral hours at 18°, and was fometimes feveral degrees lower. The intention of adding water to the fnow and falt was to leffen the intenfity of the cold of this mixture, and to render it more permanent than if the fnow and falt alone were mixed. The acids which had frozen in melting fnow were five in number; which, being thawed and brought to the temperature of 60°, were found on examination to have the following fpecific gravities, viz. 1786, 1784, 1780, 1778, 1775. Thofe which had not congealed with the melting fnow, but which did fo with the mixture of fnow, falt, and water, were found, when brought to the temperature of 60°, to be of the following fpecific gravities, viz. 1814, 1810, 1804, 1794, 1790, 1770, 1759, 1750. Thofe which remained, and would freeze neither in melting fnow nor in the mixture of fnow, falt, and water, were of the gravities 1846, 1839, 1815, 1745, 1720, 1700, 1610, 1551. From the firft of thefe it appears, that the medium denfity of the acids which froze with the natural cold was 1780; and from the fecond, that at the denfities of 1790 and 1770 the acid had been incapable of freezing with that degree of cold. Hence it follows, that 1780 is nearly the degree of ftrength of eafieft freezing, and that an increafe or diminution of that denfity equal to $\frac{1}{178}$th of the whole, renders the acid incapable of freezing with the cold of melting fnow, though this cold is fomething above the freezing point of the moft congealable acid. From the fecond it appears, that by applying a more intenfe cold, viz. that produced by a mixture of fnow, falt, and water, the limits of the denfities of acids capable of congelation were extended to about $\frac{3}{178}$ths above or below the point of eafieft freezing: and there feems little reafon to doubt, that, by greater

augmentations of cold, these limits may be farther extended; but in what ratio these augmentations and extensions proceed, cannot be determined, without many observations made in different temperatures.

In our own country we are seldom distressed with extreme degrees of cold: yet in the winter of 1780, Mr. Wilson of Glasgow observed, that a thermometer laid on the snow sunk to 25° below 0; but this was only for a short time; and, in general our atmosphere does not admit of very great degrees of cold for any length of time. Mr. Derham, however, in the year 1708, observed in England, that the mercury stood within one tenth of an inch of its station when plunged into a mixture of snow and salt. In 1732, the thermometer at Petersburgh stood at 28° below 0; and in 1737, when the French academicans wintered at the north polar circle, or near it, the thermometer sunk to 33° below 0; and in the Asiatic and American continents still greater degrees of cold are very common.

The following was the state of a thermometer hanging out of a window on the north aspect in St. Paul's church-yard, at Christmas, 1798: Thursday, December 27, 16° at eleven at night. Friday, 28th, 15° at seven in the morning; and 12° at eleven at night. Saturday, 29th, 26° at seven in the morning; and 32½° by twelve at noon.

THE THREE PILGRIMS AND THE DERVISE.

THREE pilgrims, a Jew, a Christian, and a Mussulman, set out from Cairo, with a caravan, in order to cross the desert of Salem. For the first part of the journey they moved with the multitude, as a drop in the stream, almost without thinking whither they were going. But reflecting, at length, that they must perish if they missed the way, they began to cast an anxious look before them, and to explore the paths of the desert. In my opinion, said the Jew, we need not long hesitate about our route: yonder, to the right, is the pillar set up by Moses, who, as every body knows, conducted thousands in safety through this wilderness; and our wisest course is to follow this land-mark which he has set up to direct us.—It is true, said the Mussulman, Moses got safely through this wilderness, but it was by a route which his firmest adherents must own to be extremely difficult. For my own part, I prefer, by much, the path that was trod by the prophet of Mecca; it is distinctly marked by that pillar to the left, which has ever directed the steps of the faithful.—I am sorry to see both of you mistaken, said the Christian, the one recommending a road so tedious as to be now almost obsolete, and the other preferring a road in which there are so many pits and precipices, and in which the sabre has been so busy, that the steps are slippery with the blood of the murdered. The straight and only safe, as well as pleasant, road, is that which has been marked by Jesus, where yonder midmost pillar rears its head on high, and meets at a distance the eye of the pilgrim. Don't you perceive, right over it, the distant towers of Salem?—I perceive them over the pillar on the right, said the Jew.—And I swear they are in a line with that on the left, said the Mussulman. They disputed, they grew warm, they quarrelled; each imagining that he could compel, by force, those whom he could not convince by reason.

In this situation, they were overtaken by a venerable dervise, who, learning

learning the cause of their difference, thus addressed them: "Children, you are not wise. Had you changed your places, your views had also changed; and, having seen the cause of your misunderstanding, you had all been reconciled. Besides, the city of Salem is so great, that a part of it, like the horizon, may be seen over each of the pillars; and it is possible, that thousands, who took the direct line by each, have found their way. For my own part, I have known many well-meaning people who, having no opportunity of knowing any of these roads, took a different course from all, and I am far from doubting of their safety; for that depends not only on the way, but, in some measure, on the prudence and care of the pilgrim. It is impossible, however, that all these roads should be equally safe and commodious, or that it should be a matter of indifference which of them is chosen. I have been considering them long, and comparing the different accounts and charts of them, as every man ought in a matter of such infinite moment. For I hold no man is at liberty to take what way he pleases, and hazard his life, without weighing the evidence in favour of each, and using his reason to enable him to make the wisest choice. I have done so with care, and my observations I give you. The road by the pillar to the right, was once the best and safest in the world, but it has been for a long time neglected, and is now much out of repair.—That by the left was at first extremely foul, nor is it yet such as could be wished: it has, however, some things to recommend it. Five times a-day the travellers are admonished, by public criers, to pray for the guidance of heaven; and all give such punctual obedience, that they seem to emulate each other in piety. On this road, too, there is much accommodation for the weak and needy. I dare not, therefore, reprobate, though I pity, all who choose it; it is because they know no better path.—But the way by the midmost pillar is, in every respect, the straightest, the safest, and the most pleasant. On this road, at almost every step, palm-trees shade and fountains refresh the pilgrim: and, did they who enter upon it follow the directions inscribed upon the pillar and the chart with which they are furnished, every other path would soon be forsaken. But, instead of this, multitudes turn aside into bye-paths on the right and on the left, and, for some trifles which attract their notice, forget to proceed on their journey. Even they who remain on the road too often spend their time in quarrels and contentions, almost equally fatal; some alleging that all ought to walk on this side of the road, while others contend they ought to walk on that; some searching for the track of this, and others of that, predecessor, and each alleging it is death to tread any other part of that fair and beautiful road which is open before them. By these unhappy means, the immense crowd which enters it is perpetually thinned as it proceeds; and but the few, who study only to be on the road, and to advance in it, reach the end of the journey. This, you may perceive, is the way which I myself intend to pursue; and I intend to do it with all my might, keeping my eye upon the chart, without searching for the track of Peter, of Martin, or of John.

"If you can think as I do, and come with me, it will give me pleasure; if not, we shall part in peace, for why should we quarrel, or contend with any weapons but those of reason? And, indeed, when, in our education, reading, habits of life, company, and constitution, there must be so much difference, how can it be expected

that

that our opinions ſhould entirely be the ſame; God knows our frame, and knows that, if any one of us had been in the place and circumſtances of the other, he muſt, perhaps, have had his opinions too. He knows that we all wiſh to take the courſe which is ſafeſt to ourſelves, and, of courſe, moſt pleaſing to him, ſince none of us, I truſt, would wilfully and knowingly run the hazard of periſhing in the deſert. Judge, therefore, my brethren, of each other's conduct with candour. Let each be perſuaded, in his own mind, that he does what is beſt, and, whatever road he takes, (after carefully examining and comparing them,) keep bent on getting forward to the end of his journey. Then we may poſſibly arrive, all of us, in due time, where we wiſh; and talk of the difference of the roads when we meet at Salem."

Struck with the meekneſs of his temper, and the moderation of his ſentiments, all three bluſhed for having quarrelled, and, by way of the midmoſt pillar, unanimouſly followed the dervife.

EXTRACTS FROM LA PEROUSE'S VOYAGE ROUND THE WORLD IN THE YEARS 1785, 86, 87, AND 1788.

JEAN-François Galaup de la Perouſe, *chef d'eſcadre*, was born at Albi, in 1741. Entering at a very early age into the marine ſchool, his enthuſiaſm was firſt excited by the example of thoſe celebrated navigators who had done honour to their country, and he took from that time the reſolution to walk in their ſteps; but, being only able to advance in this difficult road by ſlow degrees, he prepared himſelf, by previouſly ſtudying their works, hereafter to equal them. He united, at a very early period, experience with theory; he had been eighteen years at ſea when the command of the laſt expedition was entruſted to him. He entered as midſhipman in 1756, and ſerved five years at ſea during that war. In 1764 he was promoted to the rank of *enſeigne de vaiſſeau*, and afterwards ſerved as commander on-board ſeveral ſhips, where he conducted himſelf in many engagements with the utmoſt ſkill and bravery. In 1781 the French government formed the project of taking and deſtroying the eſtabliſhments of the Engliſh in Hudſon's Bay: La Pérouſe was appointed to execute this troubleſome miſſion, which, after experiencing many dangers, he partly accompliſhed: in conformity with rigorous orders to deſtroy the poſſeſſions of his enemies, he did not forget at the ſame time the reſpect that was due to misfortune; he had the humanity to leave behind him proviſions and arms for the Engliſh, who had fled into the woods at his approach. On this ſubject, the editor quotes the following ſincere declaration of an Engliſh ſeaman in his account of a Voyage to Botany Bay:—"We ought to call to mind, with gratitude, in England eſpecially, this humane and generous man, for his conduct when ordered to deſtroy our eſtabliſhment in Hudſon's Bay, in the courſe of the laſt war."

On the eſtabliſhment of peace in 1783, this expedition ended:—"The indefatigable La Pérouſe enjoyed not a long repoſe: a more important ſervice awaited him; alas! it was deſtined to be the laſt. He was appointed to command the expedition projected in 1785, preparations for which were forwarding at Breſt."

La Pérouſe, according to his laſt letters from Botany Bay, was to return to the Iſle de France in 1788.—The two following years being expired,

expired, the Society of Natural Hiſtory requeſted at the bar of the national aſſembly that veſſels might be ſent out in ſearch of him; this requeſt was received with the moſt lively intereſt, and followed up by a law, ordering two frigates to be immediately fitted out in ſearch of La Pérouſe.

General d'Entrecaſteaux commanded this new expedition: "He completely fulfilled the order preſcribed by his inſtructions, without being able to obtain the ſmalleſt information, or acquire any thing like probability concerning the fate of our unfortunate navigator."

There were various conjectures in France as to the cauſe of his loſs: ſome perſons, unacquainted with the track he had to follow from Botany Bay, which is traced in his letter, have advanced, that his ſhips had been caught in the ice, and that La Péroufe, and all his companions, had periſhed by the moſt horrible of deaths; others have given out, that during his paſſage to the Iſle de France, towards the end of 1788, he had been the victim of that violent hurricane, which proved ſo fatal to the Venus frigate, which was never heard of afterwards, and which totally diſmaſted the Reſolution frigate.—The public indications ſtill in exiſtence of the track he followed, and of the places he examined, are the medals ſtruck on occaſion of his voyage, and left or diſtributed by La Péroufe during the courſe of it. He took out with him about a hundred of ſilver and bronze, and ſix hundred others of different kinds. As we know the route which he had ſtill to perform, theſe medals may one day point out to us nearly in what ſpot his misfortune interrupted it.

In concluding his account of the animal and vegetable productions of Port des Français, M. de la Péroufe obſerves, "that, if they reſemble a great many others, the appearance of the country has no ſort of compariſon; and I have my doubts whether the profound valleys of the Alps and Pyrenees preſent views as frightful, but which are at the ſame time ſo picturesque, that they would deſerve the viſits of the curious, were they not at the extremity of the world."

Nature aſſigns inhabitants to ſo frightful a country, who as widely differ from the people of civilized countries as the ſcene I have juſt deſcribed differs from our cultivated plains; as rude and barbarous as their ſoil is rocky and barren, they inhabit this land only to deſtroy its population: at war with all the animals, they deſpiſe the vegetable ſubſtances which grow around them. I have ſeen women and children eat ſome raſpberries and ſtrawberries; but theſe are undoubtedly viands far too inſipid for men, who live upon the earth like vultures in the air, or wolves and tigers in the foreſts.

Their arts are ſomewhat advanced, and in this reſpect civilization has made conſiderable progreſs; but that which ſoftens their ferocity, and poliſhes their manners, is yet in its infancy: the mode of life they purſue excluding all kind of ſubordination, they are continually agitated by fear or revenge; prone to anger, and eaſily irritated, they are continually attacking each other dagger in hand. Expoſed in the winter to periſh for want, becauſe the chaſe cannot be ſucceſsful, they live during the ſummer in the greateſt abundance, as they can catch in leſs than an hour a ſufficient quantity of fiſh for the ſupport of their family: they remain idle during the reſt of the day, which they paſs at play, to which they are as much addicted as ſome of the inhabitants in our great cities. This gaming is the great

great ſource of their quarrels. If to all theſe deſtructive vices they ſhould unfortunately add a knowledge of the uſe of any inebriating liquor, I ſhould not heſitate to pronounce, that this colony would be entirely annihilated.

In vain may philoſophers exclaim againſt this picture. They write books in their cloſets, whilſt I have been engaged in voyages during a courſe of thirty years. I have been a witneſs of the injuſtice and deceptions of theſe people, whom they have deſcribed to us as ſo good, becauſe they are very near to a ſtate of nature; but this ſame nature is only ſublime in her maſſes, ſhe is negligent of all details. It is not poſſible to penetrate into woods which the hand of civilized man has not made paſſable; to traverſe plains filled with ſtones and rocks, and inundated by impaſſable marſhes; in a word, to form ſociety with man in a ſtate of nature; becauſe he is barbarous, deceitful, and wicked. In this opinion I have been confirmed by my own melancholy experience: I nevertheleſs have not thought proper to make uſe of the force which was entruſted to me, for the purpoſe of repelling the injuſtice of theſe ſavages, and of teaching them that men have rights which muſt not be violated with impunity.

Indians in their canoes were continually round our frigates; they paſſed two or three hours there before they began to exchange a few fiſhes, or two or three otter's ſkins; they ſeized all occaſions to rob us; they tore off the iron which was eaſy to be carried away; and, above all, they examined carefully how they might deceive our vigilance during the night. I cauſed the principal perſons amongſt them to come on-board my frigate; I loaded them with preſents: yet theſe very men, whom I ſo particularly diſtinguiſhed, did not diſdain the theft of an old pair of breeches or a nail. When they aſſumed a mild and pleaſant appearance, I was poſitive they had ſtolen ſomething, although I frequently pretended not to perceive it.

I had expreſsly recommended the careſſing of their children, and giving them little preſents: the parents were inſenſible to this mark of benevolence, which I thought incident to all countries; the only reflection it gave riſe to in their breaſts was, to aſk to accompany their children when I made them come on-board; and I ſeveral times, for my inſtruction, had the pleaſure of ſeeing the father take advantage of the moment in which we ſeemed moſt engaged with his child, to take up and hide under his ſkin garment every thing that lay within his reach.

Sometimes, immediately after loading them with preſents, I pretended to have a deſire for certain little articles of trifling value, which belonged to theſe Indians; but this was a trial of their generoſity, which I always made in vain.

I will however admit, if it be deſired, that it is impoſſible for a ſociety to exiſt without ſome virtues; but I am obliged to confeſs, that I had not the penetration to perceive them; quarrelling continually among themſelves, indifferent to their children, and abſolute tyrants over their women, whom they inceſſantly condemn to the moſt painful labours; I have obſerved nothing among theſe people which will permit me to ſoften the colouring of this picture.

I think I may venture to aſſert, that this port is inhabited only in the favourable ſeaſon, and that the Indians never paſs a winter in it; I did not ſee a ſingle cabin ſheltered from the rain; and, although there had never been collected together ſo many as three hundred Indians

Indians in the bay, we were vifited by feven or eight hundred others. The canoes were continually entering and going out of the bay, and each of them brought and carried away their houfe and furniture, which confifted of a great many fmall boxes, in which were enclofed their moft valuable effects: thefe boxes are placed at the entrance of their cabins, which poffefs a naftinefs and ftench, to which the den of no known animal in the world can properly be compared.—They never remove themfelves more than two fteps for the performance of any neceffary occafion, in which they feek neither for fhade nor privacy, as if they had not an inftant to lofe; and, when this happens during a meal, they take their place again, from which they never were at a greater diftance than five or fix feet. The wooden veffels in which they cook their fifh are never wafhed; they ferve them for kettle, difh, and plate; as thefe veffels cannot bear the fire, they make the water boil with red-hot flint ftones, which are renewed at intervals till the victuals are quite ready. They are alfo acquainted with the method of roafting, which differs little or nothing from that of foldiers in a camp. It is probable that we may only have feen a fmall part of thefe people, who in all likelihood inhabit a confiderable part of the fea-fhore. During the fummer they wander in the different bays, feeking their food like feals; and in the winter they pufh into the interior of the country, to hunt beavers and other animals, of which they brought us the fpoils. Though their feet are always naked, the fole of them is never callous, and they cannot, without fhrinking, walk over ftones; which is a proof they only travel in canoes, or on the fnow with rackets.

Dogs are the only animals with which they have entered into alliance; there are generally three or four of them in a cabin; they are fmall, and refemble the fhepherd's dog of M. de Buffon; they feldom bark, but have a hifs nearly refembling that of the Bengal jackal, and they are fo favage, that to other dogs they feem to be what their mafters are to civilized people.

The men pierce the cartilage of the ears and nofe, to which they hang different fmall ornaments; they make fcars on their arms and breafts, with a very keen edged inftrument, which they fharpen by paffing over their teeth as over a ftone; their teeth are filed clofe to the gums, and for this operation they ufe a fand-ftone rounded in the fhape of a tongue. They ufe ochre, foot, and plumbago, mixed up with train oil, to paint the face and the reft of the body in a frightful manner. In their full drefs, their hair is flowing at full length, powdered, and plaited with the down of fea birds: this is their greateft luxury, and is perhaps referved only to the chiefs of a family; their fhoulders are covered with a fimple fkin; the reft of the body abfolutely naked, except the head, which is generally covered with a little ftraw hat, very fkilfully plaited; but they fometimes place on their heads two horned bonnets of eagles' feathers, and even whole heads of bears in which they fix a wooden fkull cap. Thefe feveral head-dreffes are extremely various; but their principal object, like all their other cuftoms, is to render themfelves frightful, perhaps for the purpofe of keeping their enemies in awe.

Some Indians had entire fhirts of otter's fkin, and the common drefs of a great chief was a fhirt of a tanned fkin of the elk, bordered with a fringe of deers' hoofs and beaks of birds, which, when they dance, imitates the noife of a kind of bell; this fame drefs is very

well known among the ſavages of Canada, and other nations who inhabit the eaſtern parts of America.

I never ſaw any tatooing but on the arms of a few women, who are addicted to a cuſtom which renders them hideous, and which I could ſcarcely have believed, had I not been a witneſs to it; all of them, without exception, have the lower lip ſlit at the root of the gums, the whole width of the mouth; they wear a kind of wooden bowl, without handles, which reſts againſt the gums, to which this lower cut lip ſerves for a ſupport, ſo that the lower part of the mouth juts out two or three inches. The young girls have only a needle in the lower lip, and the married women alone have the right of the bowl. We ſometimes prevailed on them to pull off this ornament, to which they with difficulty agreed; they then teſtified the ſame embarraſſment, and made the ſame geſtures, as a woman in Europe who diſcovers her boſom. The lower lip then fell upon the chin, and this ſecond picture was not more enchanting than the firſt.

The Americans of Port des Français know how to forge iron, to faſhion copper, to ſpin the hair of different animals, and, by the help of a needle, to fabricate with this yarn a tiſſue equal to our tapeſtry; they intermix in this tiſſue narrow ſtrips of otter's ſkin, which gives their cloaks the ſemblance of the fineſt ſilk ſhag. In no part of the world can hats and baſkets of reeds be plaited with more ſkill; they figure upon them very agreeable deſigns; they alſo engrave very tolerable figures of men and animals in wood and ſtone; they inlay boxes with mother of pearl, the former of which is very elegant; they make ornaments of ſerpetine, to which they give the poliſh of marble.

I have ſpoken of the paſſion of theſe Indians for play; that to which they deliver themſelves up with the greateſt avidity is abſolutely a game of chance; they have thirty wooden pieces, each having different marks like our dice; of theſe they hide ſeven; each of them plays in his turn, and he whoſe gueſs comes neareſt to the number marked upon the ſeven pieces, is the winner of the ſtake agreed upon, which is generally a piece of iron or a hatchet. This gaming renders them ſerious and melancholy; I have nevertheleſs very frequently heard them ſing; and, when the chief came to pay me a viſit, he commonly paddled round the ſhip ſinging, his arms extended in the form of a croſs in token of friendſhip; he then came on-board, and played a pantomine, which was expreſſive either of combats, ſurpriſes, or death. The air which preceded this dance was agreeable, and tolerably harmonious.

I will finiſh the article reſpecting theſe people by ſaying, that we have not perceived among them any trace of anthropophagiſm; but it is ſo general a cuſtom among the Indians of America, that I ſhould ſtill perhaps have this trait to add to their picture, had they been at war, and taken any priſoners.

PHENOMENA OF CONGELATION.—Continued from p. 308.

NATURE AND PROPERTIES OF SNOW.

SNOW is formed by the freezing of the vapours in the atmoſphere. It differs from hail and hoar-froſt, in being as it were cryſtallized, which they are not. This appears on examining a flake of ſnow by a magnifying-glaſs; when the whole of it will appear to be compoſed

posed of fine shining spicula diverging like rays from a centre. As the flakes fall down through the atmosphere, they are continually joined by more of these radiated spicula, and thus increase in bulk like the drops of rain or hailstones. Dr. Grew, in a discourse of the nature of snow, observes, that many parts thereof are of a regular figure, for the most part stars of six points, and are as perfect and transparent ice as any we see on a pond, &c. Upon each of these points are other collateral points, set at the same angles as the main points themselves: among which there are divers other irregular, which are chiefly broken points, and fragments of the regular ones. Others also, by various winds, seem to have been thawed and frozen again into irregular clusters; so that it seems as if the whole body of snow were an infinite mass of icicles irregularly figured. That is, a cloud of vapours being gathered into drops, the said drops forthwith descend; upon which descent, meeting with a freezing air as they pass through a colder region, each drop is immediately frozen into an icicle, shooting itself forth into several points; but these still continuing their descent, and meeting with some intermitting gales of warmer air, or in their continual waftage to and fro touching upon each other, some of them are a little thawed, blunted, and again frozen into clusters, or intangled so as to fall down in what we call *flakes*.

The lightness of snow, although it is firm ice, is owing to the excess of its surface, in comparison to the matter contained under it; as gold itself may be extended in surface till it will ride upon the least breath of air.

The whiteness of snow is owing to the small particles into which it is divided; for ice, when pounded, will become equally white. An artificial snow has been made by the following experiment. A tall phial of aquafortis being placed by the fire till it is warm, and filings of pure silver, a few at a time, being put into it; after a brisk ebullition, the silver will dissolve slowly. The phial being then placed in a cold window, as it cools the silver particles will shoot into crystals, several of which running together will form a flake of snow, which will descend to the bottom of the phial. While they are descending, they represent perfectly a shower of silver snow, and the flakes will lie upon one another at the bottom like real snow upon the ground.

According to Signior Beccaria, clouds of snow differ in nothing from clouds of rain, but in the circumstance of cold that freezes them. Both the regular diffusion of the snow, and the regularity of the structure of its parts (particularly some figures of snow or hail which fall about Turin, and which he calls *rosette)*, shew that clouds of snow are acted upon by some uniform cause like electricity; and he endeavours to shew how electricity is capable of forming these figures. He was confirmed in his conjectures by observing, that his apparatus for observing the electricity of the atmosphere never failed to be electrified by snow as well as rain. Professor Winthrop sometimes found his apparatus electrified by snow when driven about by the wind, though it had not been affected by it when the snow itself was falling. A more intense electricity, according to Beccaria, unites the particles of hail more closely than the more moderate electricity does those of snow, in the same manner as we see that the drops of rain which fall from thunder-clouds are larger than those

thofe which fall from others, though the former defcend through a lefs fpace.—But we are not to confider fnow merely as a curious and beautiful phenomenon. The Great Difpenfer of univerfal bounty has fo ordered it, that it is eminently fubfervient, as well as all the works of creation, to his benevolent defigns. Were we to judge from appearances only, we might imagine, that, fo far from being ufeful to the earth, the cold humidity of fnow would be detrimental to vegetation. But the experience of all ages afferts the contrary. Snow, particularly in thofe northern regions where the ground is covered with it for feveral months, fructifies the earth, by guarding the corn or other vegetables from the intenfer cold of the air, and efpecially from the cold piercing winds. It has been a vulgar opinion, very generally received, that fnow fertilizes the lands on which it falls more than rain, in confequence of the nitrous falts which it is fuppofed to acquire by freezing. But it appears from the experiments of Margraaf in the year 1751, that the chemical difference between rain and fnow-water is exceedingly fmall; that the latter is fomewhat lefs nitrous, and contains a fomewhat lefs proportion of earth than the former; but neither of them contain either earth or any kind of falt in any quantity which can be fenfibly efficacious in promoting vegetation. Allowing, therefore, that nitre is a fertilizer of lands, which many are upon good grounds difpofed utterly to deny, yet fo very fmall is the quantity of it contained in fnow, that it cannot be fuppofed to promote the vegetation of plants upon which the fnow has fallen. The peculiar agency of fnow, as a fertilizer in preference to rain, may admit of a very rational explanation, without recurring to nitrous falts fuppofed to be contained in it. It may be rationally afcribed to its furnifhing a covering to the roots of vegetables, by which they are guarded from the influence of the atmofpherical cold, and the internal heat of the earth is prevented from efcaping.

The internal parts of the earth, by fome principle which we do not underftand, is heated uniformly to the 48th degree of Fahrenheit's thermometer. This degree of heat is greater than that in which the watery juices of vegetables freeze, and it is propagated from the inward parts of the earth to the furface, on which the vegetables grow. The atmofphere being variably heated by the action of the fun in different climates, and in the fame climate at different feafons, communicates to the furface of the earth, and to fome diftance below it, the degree of heat or cold which prevails in itfelf. Different vegetables are able to preferve life under different degrees of cold, but all of them perifh when the cold which reaches their roots is extreme. Providence has therefore, in the coldeft climates, provided a covering of fnow for the roots of vegetables, by which they are protected from the influence of the atmofpherical cold. The fnow keeps in the internal heat of the earth, which furrounds the roots of vegetables, and defends them from the cold of the atmofphere.

Snow or ice water is always deprived of its fixed air, which efcapes during the procefs of congelation. Accordingly, as fome of the inhabitants of the Alps who ufe it for their conftant drink have enormous wens upon their throats, it has been afcribed to this circumftance. If this were the caufe of thefe wens, it would be eafy to remove it by expofing the fnow-water to the air for fome time. But feveral eminent phyficians have rejected the notion that fnow-water

is the cause of these wens; for in Greenland, where snow-water is commonly used, the inhabitants are not affected with such swellings: on the other hand, they are common in Sumatra, where snow is never seen.

We may here notice a remarkable snow-grotto, which is an excavation made by the waters on the side of Mount Etna, by making their way under the layers of lava, and by carrying away the bed of pozzolana below them. It occurred to the proprietor, that this place was very suitable for a magazine of snow: for in Sicily, at Naples, and particularly at Malta, they are obliged for want of ice to make use of snow for cooling their wine, sherbet, and other liquors, and for making sweetmeats.

This grotto was hired by the knights of Malta, who, having neither ice nor snow on the rock which they inhabit, have hired several caverns on Etna, into which people whom they employ collect and preserve quantities of snow to be sent to Malta when needed. This grotto has therefore been repaired within at the expence of that order; flights of steps are cut into it, as well as two openings from above, by which they throw in the snow, and through which the grotto is enlightened. Above the grotto they have also levelled a piece of ground of considerable extent: this they have inclosed with thick and lofty walls, so that when the winds, which at this elevation blow with great violence, carry the snow from the higher parts of the mountain, and deposite it in this inclosure, it is retained and amassed by the walls. The people then remove it into the grotto through the two openings; and it is there laid up, and preserved in such a manner as to resist the force of the summer heats; as the layers of lava with which the grotto is arched above prevent them from making any impression.

When the season for exporting the snow comes on, it is put into large bags, into which it is pressed as closely as possible; it is then carried by men out of the grotto, and laid upon mules, which convey it to the shore, where small vessels are waiting to carry it away.

But, before those lumps of snow are put into bags, they are wrapped in fresh leaves; so that, while they are conveyed from the grotto to the shore, the leaves may prevent the rays of the sun from making any impression upon them.

The Sicilians carry on a considerable trade in snow, which affords employment to some thousands of mules, horses, and men. They have magazines of it on the summits of their loftiest mountains, from which they distribute it through all their cities, towns, and houses; for every person in the island makes use of snow. They consider the practice of cooling their liquors as absolutely necessary for the preservation of health; and in a climate the heat of which is constantly relaxing the fibres, cooling liquors, by communicating a proper tone to the fibres of the stomach, must greatly strengthen them for the performance of their functions.

In this climate a scarcity of snow is no less dreaded than a scarcity of corn, wine, or oil. We are informed by a gentleman who was at Syracuse in the year 1777, when there was a scarcity of snow, the people of the town learned that a small vessel loaded with that article was passing the coast; without a moment's deliberation they ran in a body to the shore and demanded her cargo; which when the crew refused to deliver up, the Syracusans attacked and took, though with the loss of several men.

REMARKABLE

REMARKALBE RECOVERIES FROM APPARENT DEATH.

It happens more frequently than is commonly imagined, that perſons, ſuppoſed to be dead, and treated as ſuch, poſſeſs, nevertheleſs, in ſome parts of the body, ſuch remains of heat and motion as, with proper aſſiſtance, might contribute to reſtore them entirely to life. We have had many inſtances of this nature in the frequent recovery of perſons that have been drowned, and doubt not but the ſame ſucceſs might attend our endeavours to recover others in ſimilar circumſtances, though owing to different accidents. In this climate we are not often ſubject to the ſevereſt extremities of cold; and yet we have had ſome inſtances of people having been frozen to death. The firſt anecdote we ſhall relate is from the Memoirs of the Royal Academy of Sweden, publiſhed in the year 1758:

On the 23d of March, 1756, a peaſant about 60 years of age, of the province of Scheeren in Sweden, having been made very drunk with brandy, was, in his way home, thrown down by the violence of the wind; and, as he was too far gone in liquor to recover his legs again, he ſoon fell aſleep where he lay. Not being diſcovered till the next morning, he was found then frozen ſtiff, and taken up for dead. He was put into a ſhell, in order for interment; when fortunately Mr. Nauder, a phyſician of the province of Gothland, being on a journey, arrived on the ſpot where the accident happened. He examined the body; the face and all the extremities were cold as ice, and the cheeks of an extraordinary red colour. The joints were immoveable; the eyes were open, and fixed. Not the leaſt motion of the heart or pulſe, nor the ſmalleſt ſigns of reſpiration, were left; and the feet were ſo completely frozen, that the toes were all become black, except the great toe of the right foot. After ſome time contemplating on theſe unfavourable circumſtances, Mr. Nauder imagined he could perceive ſome warmth at the pit of the ſtomach, which encouraged him to hope the poor object might be recovered; but there being no apothecary, nor medicines of any kind to be had in the place, he was reduced to try the following methods: He began by ordering the arms, legs, and loins, of the patient to be rubbed with coarſe woollen cloths. He put on the ſtomach and belly, warm cloths of the ſame kind, which were frequently changed, increaſing their warmth by degrees. At the ſame time the patient was laid on a mattraſs on the floor; no care being taken as yet about his feet, which the phyſician ſuppoſed it was impoſſible to ſave. On reflecting afterwards, however, on the cuſtom of putting frozen meat into cold water, in order to thaw it without prejudice, he had a mind to try the ſame expedient. But, as the joints were as yet inflexible, he could not find means to immerſe the feet in water, ſo was obliged to content himſelf with ordering wet linen cloths, frequently changed, to be wrapped round them.

By theſe means, the region of the heart began to recover warmth, but it was not till after four hours conſtant rubbing, there was the leaſt appearance of reſpiration. This was about two o'clock in the afternoon. No pulſe, however, was to be perceived till near half an hour after three; when the muſcles began to loſe their rigidity; the cheeks relaxed, and before five a ſilver ſpoon might be got in between his teeth. At this time they ſtrove to make him ſwallow ſome hot wine, which with much difficulty was effected: after which his face was covered with ſweat, and his cheeks began to return to their natural colour. Soon afterwards he began to move his eyebrows, and,

and, at six o'clock, his arms and hands. He was now placed in his bed, before a good fire; his arms and legs being well covered with warm blankets. He took also two more spoonfuls of hot wine; and, about eight o'clock, began first to talk, but in a manner very confused and unintelligible; being delirious, and fancying himself still in the forest. By degrees the cold had almost left his feet, and the blackness of the toes in a great measure disappeared, although the free motion of the joints was not as yet restored. About ten o'clock, however, he began to bend his back, and complained of a violent pain in his legs. He took now a little beer made hot, with an egg beat in it, and soon after went to sleep. In the morning, his feet were warm, and without pain, and his toes recovered entirely their natural colour, but both were extremely tender. His pulse beat quick and strong, and together with a burning thirst indicated bleeding; but, no lancet being to be got, Mr. Nauder ordered him some water-gruel, which he drank of at intervals, plentifully, till noon; when he was relieved farther by a stool. He went again in the evening to sleep, and was the next morning capable of sitting up, and being conveyed home in a carriage, not indeed entirely free from pain, but in a fair way of a perfect and speedy recovery.

The following is the remarkable case of a young woman who had lain some hours under water; from the Journal Historique for December, 1758.

This account was communicated to the author of the above-mentioned journal by Dr. du Moulin, an eminent physician, who accidentally, and luckily for the poor girl, happened to hear of her misfortune soon after she was taken out of the water.

A servant maid, he says, of about eighteen years of age, had fallen into a river, down which she was carried, by the force of the stream, upwards of one hundred and fifty paces from the place she fell in at. But her clothes catching hold of some piles, driven down for the use of a neighbouring tanner, she there stopt; and, some hours after, the tanner's people coming that way, she was taken up. Being personally unknown to those who first found her, she was exposed some time before her friends heard of the disaster that had happened. At length she was carried to the house of her mistress; where she was stript and laid down before the fire, without any hopes however of her recovery. In this situation the doctor found her, without motion, stiff and cold, her eyes shut, her mouth open, her countenance pale and hollow, and her whole body much swelled and full of water. She had no pulse, and, the case being looked upon as desperate, the doctor had a mind to try an experiment, suggested to him by what he had observed of flies and other insects, that, being drowned and apparently dead, will yet recover by half burying them in ashes, or salt. He accordingly ordered a sufficient quantity of dry pot-ashes to be strowed upon a bed to about three inches deep: upon this layer of ashes the girl was placed, and another layer of ashes of about two inches deep was sprinkled over her. On her head was put a cap, containing a good quantity of ashes also, and round her throat a stocking filled with the same. The blankets were now laid on the bed, and thus the patient lay about half an hour; when her pulse began to beat, by degrees she recovered her voice, and soon cried our articulately, "O, I am frozen!—I am frozen!"

A cor-

A cordial was adminiftered, and fhe continued to lie eight hours in in the afhes; during which time the water came away by the urinary paffages, to an amazing quantity: after which fhe found herfelf greatly relieved; and, though for the three following days fhe was ftill a little indifpofed, the indifpofition was flight, and went foon off. In want of a fufficient quantity of dry pot-afhes, dry falt may be ufed, and, according to the doctor, with the fame fuccefs.

SITUATION FOR ERECTING COTTAGES.

GREAT farmers are very unwilling to admit cottages clofe to their farms; and nothing is more common, than for a poor labourer to be obliged to come a mile, and fometimes more, to his labour, and return home again at night, in all kinds of weather, after he has done a hard day's work. Cottages fhould therefore be erected, if poffible, on fome fheltered fpot, near the farm where the labour lies; and true policy points out, that every farm ought to have a fufficient number of fuch ufeful appendages, in proportion to its fize. Such cottages, under fome fuch regulations as thefe, would be of great ufe and ornament to a country, and a real credit to every gentleman's refidence; as, on the contrary, nothing can reflect greater difgrace upon him, than a fhattered miferable hovel at his gate, unfit for human creatures to inhabit. Upon encouragement like this, good tenants would never be wanting. Induftry would meet with a reward, the poor-rates would neceffarily be lightened, and population increafed. A farm thus provided with fuch a fufficient number of labourers as might, at all times and feafons, be depended upon, would be of more value on that account. The tenant of fuch farm would not be fubject to pay exorbitant wages, as he otherwife muft, on particular occafions. He would not be obliged to court the vagrant to lend him a precarious affiftance, or to have recourfe to towns to pick up diforderly people. In fummer, befides the ufual bufinefs of hay-making, he might employ even the women and children in weeding and other ufeful bufinefs.

Almoft every parifh is, in a great meafure, fubject to fome particular gentleman, who has fufficient power and influence over it, to correct the prefent grievance, and to fet a better example. Such gentlemen fhould confider themfelves as guardians of the poor, and attend to their accommodation and happinefs: it is their particular bufinefs, becaufe they and their families have a lafting intereft in the profperity of the parifh: the farmers only a temporary one. If a gentleman's fortune be fo large, that he cannot attend to objects of this fort, he fhould, at leaft, recommend the cottagers to the attention of his agent; and give him ftrict inftructions, to act as their friend and protector; for, unlefs fome fuch check be put upon great farmers, they are very apt to contribute to the demolition, inftead of the protection, of cottages; and, when the neft is deftroyed, the bird muft emigrate into fome other parifh. A cottager, in this cafe, has no other choice, unlefs it be to make application to the neighbouring juftice of the peace, for his order to the parifh officers to find him fome other place to lay his head in. If it were not for this excellent law, which obliges parifh officers to find habitations for their poor, I am forry to remark, that in many parifhes, they would literally be driven into the open fields.

ADULTERATION

ADULTERATION OF MILK.

THE following curious facts on this subject, so interesting to the inhabitants of this metropolis, are extracted from Middleton's Agricultural Survey of the County of Middlesex:

The consumers of milk pay three-pence halfpenny per quart to the retailers. If the latter were to sell the milk pure and unadulterated at this price, it would yield them a profit of 64l. 14s. per cent. But, in order to discover the actual profit of the retailers, we must add sixpence for short measure, and the extraneous articles mixed with it, which increases 2s. 4d. the usual price of eight quarts, to 2s. 10d. and, as it costs them only 1s. 5d. there remains for labour and profit 100 per cent. Thus the retailer clears 28l. 6s. 8d. by every cow. On the whole, they divide among them the unreasonable large sum of 240,833l. and the sum paid for milk amounts to 481,666l.

When the families of fashion are in London for the winter season, the consumption, and consequent deterioration, of milk, are at the highest. During the summer months, when such families are for the most part in the country, the milk may probably be of rather a better quality. The cream is taken from so much as remains unsold, and made into fresh butter for the London markets. The butter-milk is given to the hogs.

The milk is always given in its genuine state to the retail dealers; and, as it is sold to them by the cow-keepers after the rate of $2\frac{1}{8}$d. per quart, and is retailed by them at $3\frac{1}{2}$d. per quart, the profit is surely so large as ought to prevent even the smallest adulteration. But when it is considered how much it is reduced by water, and impregnated with much worse ingredients, it is to be lamented that no method has yet been devised, to put a stop to the many scandalous frauds and impositions in general practised with regard to this very necessary article of human sustenance.

It is certainly an object well deserving the consideration of the legislature. It cannot be doubted but that many persons would be glad to make some addition to the price now paid for it, (high as that price is,) provided they could, for such increased price, procure so useful an article in domestic economy perfectly genuine.

Five or six men only are employed in attending near three hundred cows. As one woman cannot milk more than eight or nine cows twice a-day, that part of the business would necessarily be attended with considerable expence to the cow-keeper, were it not that the retailer agrees for the produce of a certain number of cows, and takes the labour and expence of milking on himself.

Every cow-house is provided with a milk-room, where the milk is measured, and served out by the cow-keeper; and this room is mostly furnished with a pump, to which the retail dealers apply in rotation; not secretly, but openly, before any person that may be standing by; from which they pump water into the milk-vessel, at their discretion. The pump is placed there expressly for that purpose, and indeed is very seldom used for any other. A considerable cow-keeper in Surrey has a pump of this kind, which goes by the name of the *famous black cow* (from the circumstance of its being painted black), and is said to yield more than all the rest put together.

DESCRIPTION OF THE BAY OF NAPLES.

THE bay is of a circular figure; in moſt places upwards of 20 miles in diameter; ſo that, including all its breaks and inequalities, the circumference is conſiderably more than 60 miles. The whole of this ſpace is ſo wonderfully diverſified by all the riches both of art and nature, that there is ſcarce an object wanting to render the ſcene complete; and it is hard to ſay, whether the view is more pleaſing from the ſingularity of many of theſe objects, or from the incredible variety of the whole. You ſee an amazing mixture of the antient and modern; ſome riſing to fame, and ſome ſinking to ruin. Palaces reared over the tops of other palaces, and antient magnificence trampled under foot—by modern folly. Mountains and iſlands, that were celebrated for their fertility, changed into barren waſtes, and barren waſtes into fertile fields and rich vineyards. Mountains ſunk into plains, and plains ſwelled into mountains. Lakes drunk up by volcanos, and extinguiſhed volcanos turned into lakes. The earth ſtill ſmoking in many places; and in others throwing out flame. In ſhort, Nature ſeems to have formed this coaſt in her moſt capricious mood; for every object is a *luſus naturæ*. She never ſeems to have gone ſeriouſly to work; but to have devoted this ſpot to the moſt unlimited indulgence of caprice and frolic.

The bay is ſhut out from the Mediterranean by the iſland of Caprè, ſo famous for the abode of Auguſtus; and afterwards ſo infamous for that of Tiberius. A little to the weſt lie thoſe of Iſchia, Procida, and Niſida; the celebrated promontory of Micænum, where Æneas landed; the claſſic fields of Baia, Cuma, and Puzzoli; with all the variety of ſcenery that formed both the Tartarus and Elyſium of the ancients; the Campi Phlegrei, or burning plains where Jupiter overcame the giants; the Monte Novo, formed of late years by fire; the Monte Barbaro; the pictureſque city of Puzzoli, with the Solfattera ſmoking above it; the beautiful promontory of Pauſillippe, exhibiting the fineſt ſcenery that can be imagined; the great and opulent city of Naples, with its three caſtles, its harbour full of ſhips from every nation, its palaces, churches, and convents innumerable. The rich country from thence to Portici, covered with noble houſes and gardens, and appearing only a continuation of the city. The palace of the king, with many others ſurrounding it, all built over the roofs of thoſe of Herculaneum, buried near a hundred feet by the eruptions of Veſuvius. The black fields of lava that have run from that mountain, intermixed with gardens, vineyards, and orchards. Veſuvius itſelf, in the back ground of the ſcene, diſcharging volumes of fire and ſmoke, and forming a broad track in the air over our heads, extending without being broken or diſſipated to the utmoſt verge of the horizon. A variety of beautiful towns and villages, round the baſe of the mountain, thoughtleſs of the impending ruin that daily threatens them. Some of theſe are reared over the very roofs of Pompeia and Stabia, where Pliny periſhed; and with their foundations have pierced through the ſacred abodes of the ancient Romans; thouſands of whom lie buried here, the victims of this inexorable mountain. Next follows the extenſive and romantic coaſt of Caſtello Mare, Sorrentum, and Mola; diverſified with every pictureſque object in nature. It was the ſtudy of this wild and beautiful country that

that formed our greateſt landſcape-painters. This was the ſchool of Pouſſin and Salvator Roſa, but more particularly of the laſt, who compoſed many of his moſt celebrated pieces from the bold craggy rocks that ſurround this coaſt; and no doubt it was from the daily contemplation of theſe romantic objects, that they ſtored their minds with that variety of ideas they have communicated to the world with ſuch elegance in their works.

This extenſive coaſt, this prodigious variety of mountains, valleys, promontories, and iſlands, covered with an everlaſting verdure, and loaded with the richeſt fruits, is all the produce of ſubterraneous fire; the fact is certain, and can only be doubted by thoſe who have wanted time or curioſity to examine it. It is ſtrange that Nature ſhould make uſe of the ſame agent to create as to deſtroy; and that what has only been looked upon as the conſumer of countries, is in fact the very power that produces them. Indeed, this part of our earth ſeems already to have undergone the ſentence pronounced upon the whole of it; but, like the phœnix, has riſen again from its own aſhes, in much greater beauty and ſplendour than before it was conſumed. The traces of theſe dreadful conflagrations are ſtill conſpicuous in every corner; they have been violent in their operations, but in the end have proved ſalutary in their effects. The fire in many places is not yet extinguiſhed, but Veſuvius is now the only ſpot where it rages with any degree of activity.

RUINS of POESTUM.

AMONG the circumſtances contributing to render the kingdom of Naples ſo intereſting a ſubject of curioſity, is to be included that of its containing very conſiderable remains of ancient magnificence, which had remained totally undiſcovered for ſeveral centuries. In 1755, an apprentice to a painter at Naples, who was on a viſit to his friends at Capaccio, by accident took a walk to the mountains which ſurround the territory of Pœſtum. The only habitation he perceived was the cottage of a farmer, who cultivated the beſt part of the ground, and reſerved the reſt for paſture. The ruins of the ancient city of Pœſtum, or Poſſidonia, made a part of this view, and particularly ſtruck the eyes of the young painter. Upon his return to Capaccio, he conſulted the neighbouring people about the origin of theſe monuments of antiquity. He could only learn, that this part of the country had been uncultivated and abandoned during their memory; that about ten years before, the farmer, whoſe habitation he had noticed, eſtabliſhed himſelf there; and that having dug in many places, and ſearched among the ruins that lay round him, he had found treaſures ſufficient to enable him to purchaſe the whole. At the painter's return to Naples, he informed his maſter of theſe particulars, whoſe curioſity was ſo greatly excited by the deſcription, that he took a journey to the place, and made drawings of the principal views. Theſe were ſhewn to the King of Naples, who ordered the ruins to be cleared, and Pœſtum aroſe from the obſcurity in which it had remained for upwards of 700 years, as little known to the inhabitants as the travellers.

The following is a conciſe deſcription of Pœſtum in its preſent ſtate. It is of an oblong figure, about two miles and a half in circumference. It has four gates, which are oppoſite to each other. On the key-

 ſtone

ſtone of the arch of the north-gate, on the outſide, is the figure of Neptune in baſſo relievo, and within a hippocampus. The walls which ſtill remain are compoſed of very large cubical ſtones, and are extremely thick, in ſome parts, 18 feet. That the walls have remained unto this time, is owing to the very exact manner in which the ſtones are fitted to one another, a circumſtance obſerved univerſally in the maſonry of the ancients, and perhaps in ſome meaſure to a ſtalactical concretion which has grown over them. On the walls here and there are placed towers of different heights, thoſe near the gates being much higher and larger than the others.

From its ſituation among marſhes, bituminous and ſulphurous ſprings, Pœſtum muſt have been unwholeſome. In ſuch a ſituation the water muſt have been bad. Here the inhabitants were obliged to convey that neceſſary of life from purer ſprings by means of aqueducts, of which many veſtiges ſtill remain.

The principal monuments of antiquity are, a theatre, an amphitheatre, and three temples. The theatre and amphitheatre are much ruined. The firſt temple is hexaſtylos and amphiproſtylos. At one end the pilaſters which divided the cella from the pronaos are ſtill remaining. Within the cella are two rows of ſmaller columns, with an architrave, which ſupport the ſecond order. The ſecond temple is alſo amphiproſtylos; it has nine columns in front and 18 in flank. The third is likewiſe amphiproſtylos, and it has ſix columns in front and 13 in flank. The columns of theſe temples are of that kind of Doric order which we find employed in works of the greateſt antiquity. They are hardly five diameters in height. They are without baſes, which alſo has been urged as a proof of their antiquity; but we do not find that the ancients ever uſed baſes of this order, at leaſt till very late. Vitruvius makes no mention of baſes to this order; and the only inſtance we have of it, is in the firſt order of the coliſæum, at Rome, which was built by Veſpaſian. The pillars of theſe temples are fluted with very ſhallow flutings, in the manner deſcribed by Vitruvius. The columns diminiſh from the bottom, which was the moſt ancient method almoſt univerſally in all the orders. The columns have aſtragals of a very ſingular form, which ſhews the error of thoſe who imagine that this member was firſt invented with the Ionic order, to which the Greeks gave an aſtragal, and that the Romans were the firſt who applied it to the Doric. The echinus of the capital is of the ſame form with that of the temple of Corinth deſcribed by Le Roy. About the time when the temples of Pœſtum were built, architecture ſeems to have received that degree of improvement which the elegant taſte of the Greeks had ſtruck out from the rude maſſes of the Egyptians, the firſt inventors of this as of many other arts.

SINGULAR CHARACTER AT BAGARIA, NEAR PALERMO.

[From BRYDONE'S TOUR through SICILY and MALTA.]

THE Prince of P——, a man of immenſe fortune, has devoted his whole life to the ſtudy of monſters and chimeras, greater and more ridiculous than ever entered into the imagination of the wildeſt writers of romance or knight-errantry.

The amazing crowd of ſtatues that ſurround his houſe, appear at a diſtance like a little army drawn up for its defence; but when you get

get amongst them, and every one assumes his true likeness, you imagine you have got into the regions of delusion and enchantment; for of all that immense group, there is not one made to represent any object in nature; nor is the absurdity of the wretched imagination that created them less astonishing than its wonderful fertility. It would require a volume to describe the whole, and a sad volume indeed it would make. He has put the heads of men to the bodies of every sort of animal, and the heads of every other animal to the bodies of men. Sometimes he makes a compound of five or six animals that have no sort of resemblance in nature. He puts the head of a lion to the neck of a goose, the body of a lizard, the legs of a goat, the tail of a fox. On the back of this monster, he puts another, if possible still more hideous, with five or six heads, and a bush of horns, that beats the beast in the Revelations all to nothing. There is no kind of horn in the world that he has not collected; and his pleasure is to see them all flourishing upon the same head. This is a strange species of madness; and it is truly unaccountable that he has not been shut up many years ago; but he is perfectly innocent, and troubles nobody by the indulgence of his phrenzy; on the contrary, he gives bread to a number of statuaries and other workmen, whom he rewards in proportion as they can bring their imaginations to coincide with his own; or, in other words, according to the hideousness of the monsters they produce. It would be idle and tiresome to be particular in an account of these absurdities. The statues that adorn, or rather deform, the great avenue, and surround the court of the palace, amount already to six hundred, notwithstanding which, it may be truly said, that he has not broken the second commandment; for of all that number, there is not the likeness of any thing in heaven above, in the earth beneath, or in the waters under the earth. The old ornaments which were put up by his father, who was a sensible man, appear to have been in a good taste. They have all been knocked to pieces, and laid together in a heap, to make room for this new creation.

The inside of this inchanted castle corresponds exactly with the out; it is in every respect as whimsical and fantastical, and you cannot turn yourself to any side, where you are not stared in the face by some hideous figure or other. Some of the apartments are spacious and magnificent, with high arched roofs; which, instead of plaister or stucco, are composed entirely of large mirrors, nicely joined together. The effect that these produce (as each of them makes a small angle with the other) is exactly that of a multiplying glass; so that, when three or four people are walking below, there is always the appearance of three or four hundred walking above. The whole of the doors are likewise covered over with small pieces of mirror, cut into the most ridiculous shapes, and intermixed with a great variety of crystal and glass of different colours. All the chimney-pieces, windows, and side-boards, are crowded with pyramids and pillars of tea-pots, caudle-cups, bowls, cups, saucers, &c. strongly cemented together; some of these columns are not without their beauty: one of them has a large china chamber-pot for its base, and a circle of pretty little flower-pots for its capital; the shaft of the column, upwards of four feet long, is composed entirely of tea-pots of different sizes, diminished gradually from the base to the capital. The profusion of china that has been employed in

in forming thefe columns is incredible ; I dare fay there is not lefs than forty pillars and pyramids formed in this ftrange fantaftic manner.—Moft of the rooms are paved with fine marble tables of different colours, that look like fo many tomb-ftones. Some of thefe are richly wrought with lapis lazuli, porphyry, and other valuable ftones; their fine polifh is now gone, and they only appear like common marble ; the place of thefe beautiful tables he has fupplied by a new fet of his own invention, fome of which are not without their merit. Thefe are made of the fineft tortoife-fhell mixed with mother of pearl, ivory, and a variety of metals ; and are mounted on fine ftands of folid brafs.

The windows of this inchanted caftle are compofed of a variety of glafs of every different colour, mixed without any fort of order or regularity. Blue, red, green, yellow, purple, violet.—So that at each window, you may have the heavens and earth of whatever colour you chufe, only by looking through the pane that pleafes you. The houfe-clock is cafed in the body of a ftatue ; the eyes of the figure move with the pendulum, turning up their white and black alternately, and make a hideous appearance.

His bed-chamber and dreffing-room are like two apartments in Noah's ark ; there is fcarcely a beaft, however vile, that he has not placed there ; toads, frogs, ferpents, lizards, fcorpions, all cut out in marble, of their refpective colours. There are a good many bufts too, that are not lefs fingularly imagined.—Some of thefe make a very handfome profile on one fide ; turn to the other, and you have a fkeleton ; here you fee a nurfe with a child in her arms ; its back is exactly that of an infant ; its face is that of a wrinkled old woman of ninety.

For fome minutes one can laugh at thefe follies, but indignation and contempt foon get the better of your mirth, and the laugh is turned into a fneer. I own I was foon tired of them ; though fome things are fo ftrangely fancied, that it may well excufe a little mirth, even from the moft rigid cynic.

The family ftatues are charming ; they have been done from fome old pictures, and make a moft venerable appearance ; he has dreffed them out from head to foot, in new and elegant fuits of marble ; and indeed the effect it produces is more ridiculous than any thing you can conceive. Their fhoes are all of black marble, their ftockings generally of red ; their clothes are of different colours, blue, green, and variegated, with a rich old-fafhioned lace. The periwigs of the men and head-dreffes of the ladies are of fine white ; fo are their fhirts, with long flowing ruffles of alabafter. The walls of the houfe are covered with fome fine baffo relievos of white marble, in a good tafte ; thefe he could not well take out, or alter, fo he has only added immenfe frames to them. Each frame is compofed of four large marble tables.

The author and owner of this fingular collection is a poor miferable lean figure, fhivering at a breeze, and feems to be afraid of every body he fpeaks to. He is one of the richeft fubjects in the ifland, and it is thought he has not laid out lefs than 20,000l. in the creation of this world of monfters and chimeras.—He certainly might have fallen upon fome way to prove himfelf a fool at a cheaper rate. However, it gives bread to a number of poor people, to whom he is an excellent mafter. His houfe at Palermo is a good deal in the

the ſame ſtyle; his carriages are covered with plates of braſs, ſo that ſome of them are muſket-proof.

The government have had ſerious thoughts of demoliſhing the regiment of monſters he has placed round his houſe; but, as he is humane and inoffenſive, and as this would certainly break his heart, they have as yet forborne. However, the ſeeing of them by women with child is ſaid to have been already attended with very unfortunate circumſtances; and ladies complain that they dare no longer take an airing in the Bagaria; that ſome hideous form always haunts their imagination for ſome time after: their huſbands too, it is ſaid, are as little ſatisfied with the great variety of horns.

ON THE CAUSES OF THE DIFFERENCE OF COMPLEXION.

FEW queſtions in philoſophy have engaged the attention of naturaliſts more than the diverſities among the human ſpecies, among which that of colour is the moſt remarkable. The great differences in this reſpect have given occaſion to ſeveral authors to aſſert, that the whole human race have not ſprung from one original; but that as many different ſpecies of men were at firſt created as there are now different colours to be found among them. All the arguments which can be brought for ſpecific differences among mankind, whether drawn from a difference of colour, ſtature, or diſpoſition, muſt neceſſarily be inconcluſive. It remains, however, a matter of no ſmall difficulty to account for the remarkable variations of colour that are to be found among different nations. On this ſubject Dr. Hunter hath publiſhed a theſis, in which he conſiders the matter more accurately than hath commonly been done, and determines abſolutely againſt any ſpecific difference among mankind. He introduces his ſubject by obſerving, that when the queſtion has been agitated, whether all the human race conſtituted only one ſpecies or not, much confuſion has ariſen from the ſenſe in which the term *ſpecies* has been adopted. He therefore thinks it neceſſary to ſet out with a definition of the term. He includes under the ſame ſpecies all thoſe animals which produce iſſue capable of propagating others reſembling the original ſtock from whence they ſprung. This definition he illuſtrates by having recourſe to the human ſpecies as an example. And in this ſenſe of the term he concludes, that all of them are to be conſidered as belonging to the ſame ſpecies. And as, in the caſe of plants, one ſpecies comprehends ſeveral varieties, depending upon climate, ſoil, culture, and ſimilar accidents; ſo he conſiders the diverſities of the human race to be merely varieties of the ſame ſpecies, produced by natural cauſes. Of the different colours obſervable among mankind, he gives the following views:

BLACK.—Africans under the line; inhabitants of New Guinea; inhabitants of New Holland.

SWARTHY.—The Moors in the northern parts of Africa; the Hottentots in the ſouthern parts of it.

COPPER-COLOURED.—The Eaſt Indians.

RED-COLOURED.—The Americans.

BROWN-COLOURED.—Tartars, Perſians, Arabs, Africans on the coaſt of the Mediterranean, Chineſe.

BROWNISH.—The inhabitants of the ſouthern parts of Europe; as Sicilians, Abyſſinians, Spaniards, Turks, and likewiſe the Samoiedes and Laplanders.

WHITE.

WHITE.—Moſt of the European nations; as Swedes, Danes, Engliſh, Germans, Poles, &c. Kabardinſki, Georgians; inhabitants of the iſlands in the Pacific Ocean.

In attempting to inveſtigate the cauſes of theſe differences, our author obſerves, that there can be no diſpute of the ſeat of colour being placed in the ſkin; that it is not even extended over the whole of this, but confined to that part named the cuticle, conſiſting of the epidermis and reticulum; and, that it chiefly occupies the latter of theſe. The cuticle is much thicker and harder in black people than in white ones; the reticulum in the latter being a thin mucus, in the former a thick membrane. He concludes that this ſeat of colour in whites is tranſparent, and either totally deprived of veſſels, or only furniſhed with very few; as the yellow colour appearing in jaundice vaniſhes on the cauſe of the diſeaſe being removed; which is not the caſe with ſtains in the cuticle from gunpowder, or ſimilar cauſes. He next points out three cauſes deſtroying the pellucidity of the cuticle, giving it a brown colour, and rendering it thicker. Theſe are, acceſs of air, naſtineſs, and the heat of the ſun. The influence of each of theſe he proves by many examples; and from theſe he is inclined to conſider the laſt as by much the moſt powerful. If, however, it be admitted that theſe cauſes have this effect, he thinks that all the diverſity of colour which is to be obſerved among mankind may be thus accounted for. He remarks, that all the inhabitants of the torrid zone incline more or leſs to a black colour. When we obſerve the differences which occur among them, we muſt at the ſame time remember, that a black colour is not referred to heat alone, but to the other cauſes alſo: and, when we attend to the diverſity of temperature that occurs even in the torrid zone, the exiſtence of a white nation there would by no means deſtroy the argument. He is farther of opinion, that the exiſtence of a brown colour, and of conſiderable varieties from white, in the northern and coldeſt parts of Europe, may very eaſily be explained. This he accounts for from the manner of life of the inhabitants, by which they are either expoſed to the inclemency of the air, or to conſtant naſtineſs from ſmoky houſes.

Having thus attempted to account, from natural cauſes, for the varieties which occur among mankind with reſpect to colour, our author obſerves, that, to all this reaſoning, an objection will naturally be made, from conſidering that infants bring theſe marks into the world along with them, before they can be expoſed to any ſuch cauſes. Dr. Hunter imagines, however, that this may readily be explained upon the ſuppoſition that many peculiarities acquired by parents are tranſmitted to their poſterity; and of this, he thinks, no one can entertain the leaſt doubt who attends to hereditary diſeaſes. Thus, gout, ſcrophula, mania, and many other affections, although at firſt induced by particular accidents, will continue to affect families for many generations. In the ſame manner, a parent, expoſed to cauſes deſtroying the natural whiteneſs of his complexion, will beget ſwarthy children; and, the ſame cauſes continuing to operate upon the ſon, the blackneſs will be increaſed. Thus all the different ſhades may have been at firſt induced, and afterwards continued.—The objection here obviated, however, might have been ſhortly anſwered by denying the fact; for it is now generally known, that the children of the blackeſt negroes are abſolutely *born white*, as will be afterwards noticed.

This

This ſubject of complexion has been very well illuſtrated by Mr. Clarkſon, in a diſſertation introduced in his Eſſay, on the commerce and ſlavery of the human ſpecies. The firſt point that occurs to be aſcertained, is, "What part of the ſkin is the ſeat of colour?" The old anatomiſts uſually divided the ſkin into two parts or laminæ; the exterior and thinneſt, called by the Greeks *epidermis*, by the Romans *cuticula*, and hence by us *cuticle*; and the interior, called by the former *derma*, and by the latter *cutis*, or *true ſkin*. Hence they muſt neceſſarily have ſuppoſed, that, as the true ſkin was in every reſpect the ſame in all human ſubjects, however various their external hue, ſo the ſeat of colour muſt have exiſted in the cuticle or upper ſurface.

Malpighi, an eminent Italian phyſician of the laſt century, was the firſt perſon who diſcovered that the ſkin was divided into three laminæ, or parts: the cuticle, the true ſkin, and a certain coagulated ſubſtance ſituated between both, which he diſtinguiſhed by the title of *rete mucoſum*, which coagulated ſubſtance adhered ſo firmly to the cuticle, as in all former anatomical preparations to have come off with it, and thence led the ancient anatomiſts to believe, that there were but two laminæ, or diviſible portions, in the human ſkin.

This diſcovery was ſufficient to aſcertain the point in queſtion: for it appeared afterwards, that the cuticle, when divided according to this diſcovery from the other lamina, was ſemi-tranſparent; that the cuticle of the blackeſt negro was of the ſame colour and tranſparency as that of the pureſt white; and hence, the true ſkins of both being invariably the ſame, that the rete mucoſum was the ſeat of colour. This has been farther confirmed by all ſubſequent anatomical experiments; by which it appears, that, whatever is the colour of this intermediate coagulated ſubſtance, nearly the ſame is the apparent colour of the upper ſurface of the ſkin. Neither can it be otherwiſe; for the cuticle, from its tranſparency, muſt neceſſarily tranſmit the colour of the ſubſtance beneath it, in the ſame manner, though not in the ſame degree, as the cornea tranſmits the colour of the iris of the eye. This tranſparency is a matter of ocular demonſtration in white people: it is conſpicuous in every bluſh; for no one can imagine that the cuticle becomes red as often as this happens: nor is it leſs diſcoverable in the veins, which are ſo eaſy to be diſcerned; for no one can ſuppoſe that the blue ſtreaks, which he conſtantly ſees in the faireſt complexions, are painted, as it were, on the ſurface of the upper ſkin. From theſe, and a variety of other obſervations, no maxim is more true in phyſiology, than that on the rete mucoſum depends the colour of the human body; or, in other words, that the rete mucoſum being of a different colour in different inhabitants of the globe, and appearing through the cuticle or upper ſurface of the ſkin, gives them that various appearance which ſtrikes us ſo forcibly in contemplating the human race.

As this can be incontrovertibly aſcertained, it is evident, that, whatever cauſes co-operate in producing this different appearance, they produce it by acting upon the rete mucoſum; which, from the almoſt incredible manner in which the cuticle is perforated, is as acceſſible as the cuticle itſelf. Theſe cauſes are probably thoſe various qualities of things, which, combined with the influence of the ſun, contribute to form what we call *climate*. For when any perſon conſiders, that the mucous ſubſtance before mentioned is found to vary

in its colour, as the climates vary from the equator to the poles, his mind muſt be inſtantly ſtruck with the hypotheſis, and he muſt adopt it without any heſitation, as the genuine cauſe of the phenomenon.

This fact, of the variation of the mucous ſubſtance, according to the ſituation of the place, has been clearly aſcertained in the numerous anatomical experiments that have been made; in which ſubjects of all nations have come under conſideration. The natives of many of the kingdoms and iſles of Aſia are found to have their rete mucoſum black; thoſe of Africa, ſituated near the line, of the ſame colour; thoſe of the maritime parts of the ſame continent, of a duſky brown, nearly approaching to it; and the colour becomes lighter or darker in proportion as the diſtance from the equator is either greater or leſs. The Europeans are the faireſt inhabitants of the world. Thoſe ſituated in the moſt ſouthern regions of Europe, have in their rete mucoſum a tinge of the dark hue of their African neighbours: hence the epidemic complexion, prevalent among them, is nearly of the colour of the pickled Spaniſh olive; while in this country, and thoſe ſituated nearer the north pole, it appears to be nearly, if not abſolutely, white.

Theſe are facts which anatomy has eſtabliſhed; and we acknowledge them to be ſuch, that we cannot diveſt ourſelves of the idea, that climate has a conſiderable ſhare in producing a difference of colour.—The only objection of any conſequence that has ever been made to the hypotheſis of climate, is this, that people under the ſame parallels are not exactly of the ſame colour. But this is no objection in fact; for it does not follow that thoſe countries which are at an equal diſtance from the equator, ſhould have their climates the ſame. Indeed nothing is more contrary to experience than this. Climate depends upon a variety of accidents. High mountains in the neighbourhood of a place make it cooler, by chilling the air that is carried over them by the winds. Large ſpreading ſucculent plants, if among the productions of the ſoil, have the ſame effect; they afford agreeable cooling ſhades, and a moiſt atmoſphere from their continual exhalations, by which the ardour of the ſun is conſiderably abated. While the ſoil, on the other hand, if of a ſandy nature, retains the heat in an uncommon degree, and makes the ſummers conſiderably hotter than thoſe which are found to exiſt in the ſame latitude where the ſoil is different. To this proximity of what may be termed *burning ſands*, and to the ſulphureous and metallic particles which are continually exhaling from the bowels of the earth, is aſcribed the different degree of blackneſs by which ſome African nations are diſtinguiſhable from each other, though under the ſame parallels. To theſe obſervations we may add, that, though the inhabitants of the ſame parallel are not exactly of the ſame hue, yet they differ only by ſhades of the ſame colour; or, to ſpeak with more preciſion, that there are no two people, in ſuch a ſituation, one of whom is white and the other black. To ſum up the whole—— Suppoſe we were to take a common globe; to begin at the equator; to paint every country along the meridian line in ſucceſſion from thence to the poles; and to paint them with the ſame colour which prevails in the reſpective inhabitants of each, we ſhould ſee the black, with which we had been obliged to begin, inſenſibly changing to an olive, and the olive, through as many intermediate colours, to a white: and if, on the other hand, we ſhould complete any one of the

the parallels according to the ſame plan, we ſhould ſee a difference perhaps in the appearance of ſome of the countries through which it ran, though the difference would conſiſt wholly in ſhades of the ſame colour.

The argument, therefore, which is brought againſt the hypotheſis, is ſo far from being an objection, that it may be conſidered as one of the firſt arguments in its favour: for, if climate has really an influence on the mucous ſubſtance of the body, it is evident, that we muſt not only expect to ſee a gradation of colour in the inhabitants from the equator to the poles, but alſo different ſhades of the ſame colour in the inhabitants of the ſame parallel.

To this argument may be added one that is uncontrovertible, which is, that when the black inhabitants of Africa are tranſplanted to colder, or the white inhabitants of Europe to hotter, climates, their children, born there, are of a different colour from themſelves; that is, lighter in the firſt, and darker in the ſecond, inſtance.

As a proof of the firſt, we ſhall give the words of the Abbé Raynal, in his admired publication. "The children," ſays he, "which they (the Africans) procreate in America, are not ſo black as their parents were. After each generation, the difference becomes more palpable. It is poſſible, that, after a numerous ſucceſſion of generations, the men come from Africa would not be diſtinguiſhed from thoſe of the country into which they may have been tranſplanted."

This circumſtance we have had the pleaſure of hearing confirmed by a variety of perſons who have been witneſſes of the fact; but particularly by many intelligent Africans, who have been parents themſelves in America, and who have declared, that the difference is ſo palpable in the northern provinces, that not only they themſelves have conſtantly obſerved it, but that they have heard it obſerved by others.

Neither is this variation in the children from the colour of their parents improbable. The children of the blackeſt Africans are born white. In this ſtate they continue for about a month, when they change to a pale yellow. In proceſs of time they become brown. Their ſkin ſtill continues to increaſe in darkneſs with their age, till it becomes of a dirty ſallow black: and at length, after a certain period of years, gloſſy and ſhining. Now, if climate has any influence on the mucous ſubſtance of the body, this variation in the children from the colour of their parents is an event which muſt be reaſonably expected: for being born white, and not having equally powerful cauſes to act upon them in colder as their parents had in the hotter climates which they left, it muſt neceſſarily follow, that the ſame effect cannot poſſibly be produced.

Hence alſo, if the hypotheſis be admitted, may be deduced the reaſon why even thoſe children who have been brought from their country at an early age into colder regions, have been obſerved to be of a lighter colour than thoſe who have remained at home till they arrived at a ſtate of manhood. For having undergone ſome of the changes which we mentioned to have attended their countrymen from infancy to a certain age, and having been taken away before the reſt could be completed, theſe farther changes, which would have taken place had they remained at home, ſeem either to have

been checked in their progreſs, or weakened in their degree by a colder climate.

We come now to the ſecond and oppoſite caſe; for a proof of which we ſhall appeal to the words of Dr. Mitchell in the Philoſophical Tranſactions, No. 476. ſect. 4. "The Spaniards, who have inhabited America under the torrid zone for any time, are become as dark coloured as our native Indians of Virginia, of which I myſelf have been a witneſs; and were they not to intermarry with the Europeans, but lead the ſame rude and barbarous lives with the Indians, it is very probable, that, in a ſucceſſion of many generations, they would become as dark in complexion."

To this inſtance we ſhall add one, which is mentioned by a late writer, who, deſcribing the African coaſt and the European ſettlements there, has the following paſſage. "There are ſeveral other ſmall Portugueſe ſettlements, and one of ſome note at Mitomba, a river in Sierra Leona. The people here called *Portugueſe*, are principally perſons bred from a mixture of the firſt Portugueſe diſcoverers with the natives, and now become, in their complexion and woolly quality of their hair, perfect negroes, retaining, however, a ſmattering of the Portugueſe language."

Theſe facts with reſpect to the colonifts of the Europeans are of the higheſt importance in the preſent caſe, and deſerve a ſerious attention. For when we know to a certainty from whom they are deſcended; when we know that they were, at the time of their tranſplantation, of the ſame colour as thoſe from whom they ſeverally ſprung; and when, on the other hand, we are credibly informed that they have changed it for the native colour of the place which they now inhabit: the evidence in ſupport of theſe facts is as great as if a perſon, on the removal of two or three families into another climate, had determined to aſcertain the circumſtance; as if he had gone with them and watched their children; as if he had communicated his obſervations at his death to a ſucceſſor; as if his ſucceſſor had proſecuted the plan: and thus an uninterrupted chain of evidence had been keen kept up from their firſt removal to any determined period of ſucceeding time.

But, though theſe facts ſeem ſufficient of themſelves to confirm our opinion, they are not the only facts which can be adduced in its ſupport. It can be ſhown, that the members of the very ſame family, when divided from each other, and removed into different countries, have not only changed their family complexion, but that they have changed it to as many different colours as they have gone into different regions of the world, we cannot have, perhaps, a more ſtriking inſtance of this than in the Jews. Theſe people are ſcattered over the face of the whole earth. They have preſerved themſelves diſtinct from the reſt of the world by their religion; and, as they never intermarry with any but thoſe of their own ſect, ſo they have no mixture of blood in their veins, that they ſhould differ from each other: and yet nothing is more true, than that the Engliſh Jew is white, the Portugueſe ſwarthy, the Armenian olive, and the Arabian copper; in ſhort, that there appear to be as many different ſpecies of Jews as there are countries in which they reſide.

To theſe facts we ſhall add the following obſervation, that, if we can give credit to the ancient hiſtorians in general, a change from the darkeſt black to the pureſt white muſt have actually been accompliſhed. One

One inftance, perhaps, may be thought fufficient. Herodotus relates, that the Colchi were black, and that they had crifped hair. Thefe people were a detachment of the Æthiopian army under Sefoftris, who followed him in his expedition, and fettled in that part of the world where Colchis is ufually reprefented to have been fituated. Had not the fame author informed us of this circumftance, we fhould have thought it ftrange that a people of this defcription fhould have been found in fuch a latitude. Now as they were undoubtedly fettled there, and as they were neither fo totally deftroyed, nor made any fuch rapid conquefts, as that hiftory fhould notice the event, there is great reafon to prefume that their defcendants continued in the fame, or fettled in the adjacent, country ; from whence it will follow, that they muft have changed their complexion to that which is obferved in the inhabitants of this particular region at the prefent day ; or, in other words, that the black inhabitants of Colchis muft have been changed into the fair Circaffian. Suppofe, without the knowledge of any hiftorian, they had made fuch confiderable conquefts as to have fettled themfelves at the diftance of 1000 miles in any one direction from Colchis, ftill they muft have changed their colour: for, had they gone in an eaftern or weftern direction, they muft have been of the fame colour as the Circaffians ; if to the north, whiter ; if to the fouth, of a copper. There are no people within that diftance of Colchis who are black.

From the whole of the preceeding obfervations on the fubject, we may conclude, that as all the inhabitants of the earth cannot be otherwife than the children of the fame parents, and as the difference of their appearance muft have of courfe proceeded from incidental caufes, thefe caufes are a combination of thofe qualities which we call *climate*, that the blacknefs of the Africans is fo far ingrafted in their conftitution, in a courfe of many generations, that their children wholly inherit it if brought up in the fame fpot; but that it is not fo wholly interwoven in their nature, that it cannot be removed if they are born and fettled in another.

The fame principles with the above we find adopted and farther illuftrated by Profeffor Zimmerman of Brunfwick, in his celebrated work, The Geographical Hiftory of Man, &c. He there proves in the moft fatisfactory manner, That the complexion of the human fpecies is uniformly correfpondent with the degree of heat or cold to which they are habitually expofed. In maintaining this pofition, he makes a very proper diftinction with regard to climate. By *climates* we are to underftand, not fimply or folely thofe diftinguifhed by the geographical divifions of the globe, to the exclufion of what he terms *phyfical* climate, or that which depends on the changes produced in any given latitude by fuch adventitious circumftances as the lower or more elevated fituations of a country, its being encompaffed by water or large tracts of land, overfpread or furrounded with forefts, placed in an extenfive plain, or environed by lofty mountains. Peculiarities of the like kind, as has been already noticed, frequently prevent the *phyfical* climate from correfponding entirely with the *geographical*, as a country influenced by them is often much warmer or colder than other regions placed under the fame degree of latitude. The influence of thefe fecondary or modifying circumftances has been already adverted to, and need not be farther enlarged upon: we fhall here only obferve, that the erroneous reafoning of Lord Kames

Kames on this subject seems to have been owing to this inattention to the difference above mentioned. At Senegal, and in the adjacent lands, the thermometer is often at 112 or 117 degrees in the shade; and here we find the inhabitants jet black, with woolly hair. The heat is equally great in Congo and Loango, and these countries are inhabited by negroes only; whereas in Morocco, to the north of these regions, and at the Cape of Good Hope, to the south, the heat is not so intense, nor are the inhabitants of so deep a hue. Lord Kames asks, Wherefore are not the Abyssinians and the inhabitants of Zaara of as dark a complexion as the Moors on the coast of Guinea? M. Zimmerman answers, that "these countries are much cooler. The desert is not only farther from the equator, but the winds blowing over the Atlas mountains, which like the Alps are covered with snow, and the westerly wind coming from the sea, must considerably mitigate the heat. Nor is Abyssinia so warm as either Monomotopa or Guinea. The north-east winds from the side of Persia and Arabia are cooled by their passage over the Red Sea: the northern winds from Egypt lose much of their heat on the chain of mountains that is extended between the countries: the winds from the south and the west are sea-winds. Thus the only quarter from which they can derive excessive heat is from the west, as the air on this side must pass over tracts of heated lands." For a similar reason it is that negroes are not found either in Asia or South America under the equator. The situations of these countries, our author observes, expose them to sea-breezes and cooling winds from the continent. He confirms this hypothesis by observing, that the mountaineers of warm climates, as in Barbary and Ceylon, are much fairer than the inhabitants of the valleys: that the Saracens and Moors, who conquered the north-east part of Africa in 1700, from being brown, are become like the negroes near the equator: that the Portuguese, who settled at Senegal in 1400, became blacks; and Tudela the Jew asserts, that his countrymen in Abyssinia acquired the dark complexion of the original natives.

Upon the whole, colour and figure may be styled habits of the body. Like other habits, they are created, not by great and sudden impressions, but by continual and almost imperceptible touches. Of habits both of mind and body, nations are susceptible as well as individuals. They are transmitted to offspring, and augmented by inheritance. Long in growing to maturity, national features, like national manners, become fixed only after a succession of ages. They become, however, fixed at last; and, if we can ascertain any effect produced by a given state of weather or of climate, it requires only repetition during a sufficient length of time to augment and impress it with a permanent character. The sanguine countenance will, for this reason, be perpetual in the highest latitudes of the temperate zone; and we shall for ever find the swarthy, the olive, the tawny, and the black, as we descend to the south.

The uniformity of the effect in the same climate, and on men in a similar state of society, proves the power and certainty of the cause. If the advocates of different human species suppose that the beneficent Deity hath created the inhabitants of the earth of different colours, because these colours are best adapted to their respective zones; it surely places his benevolence in a more advantageous light to say, he has given to human nature the power of accommodating itself to every

every zone. This pliancy of nature is favourable to the unions of the moſt diſtant nations, and facilitates the acquiſition and the extenſion of ſcience, which would otherwiſe be confined to few objects and to a very limited range. It opens the way particularly to the knowledge of the globe which we inhabit; a ſubject ſo important and intereſting to man. It is verified by experience. Mankind are for ever changing their habitations by conqueſts or by commerce; and we find them in all climates, not only able to endure the change, but ſo aſſimilated by time, that we cannot ſay with certainty whoſe anceſtor was the native of the clime, and whoſe the intruding foreigner.

ACCOUNT OF MESSINA IN SICILY.

THE approach to Meſſina is the fineſt that can be imagined; it is not ſo grand as that of Naples, but it is much more beautiful. The key is built in the form of a creſcent, and is ſurrounded by a range of magnificent buildings, four ſtories high, and exactly uniform, for the ſpace of an Italian mile. The ſtreet betwixt theſe and the ſea is about an hundred feet wide, and forms one of the moſt delightful walks in the world. It enjoys the freeſt air, and commands the moſt beautiful proſpect: it is only expoſed to the morning ſun, being ſhaded all the reſt of the day by theſe buildings. It is beſides conſtantly refreſhed by the cooling breeze from the Straits; for the current of the water produces likewiſe a current in the air, that renders this one of the cooleſt habitations in Sicily.—This beautiful city was almoſt annihilated by the plague in the year 1743, when upwards of 70,000 people are ſaid to have died in it and its diſtrict in the ſpace of a few months.

The harbour of Meſſina is formed by a ſmall promontory or neck of land that runs off from the caſt end of the city, and ſeparates that beautiful baſon from the reſt of the Straits. The ſhape of this promontory is that of a reaping hook, the curvature of which forms the harbour, and ſecures it from all winds. From the ſtriking reſemblance of its form, the Greeks, who never gave a name that did not either deſcribe the object or expreſs ſome of its moſt remarkable properties, called this place *Zancle*, or the Sickle, and feigned that the ſickle of Saturn, fell on this ſpot, and gave it its form; but the Latins, who were not quite ſo fond of fable, changed its name to Meſſina, (from *meſſis*, a harveſt,) becauſe of the great fertility of its fields. It is certainly one of the ſafeſt harbours in the world after ſhips have got in; but it is likewiſe one of the moſt difficult acceſs. The celebrated gulph or whirlpool of Charybdis lies near to its entry, and often occaſions ſuch an inteſtine and irregular motion in the water, that the helm loſes moſt of its power, and ſhips have great difficulty to get in, even with the faireſt wind that can blow. This whirlpool is probably formed by the ſmall promontory we have mentioned; which, contracting the Straits in this ſpot, muſt neceſſarily increaſe the velocity of the current; but no doubt other cauſes, of which we are ignorant, concur, for this will by no means account for all the appearances which it has produced. The great noiſe occaſioned by the tumultuous motion of the waters in this place, made the ancients liken it to a voracious ſea-monſter perpetually roaring for its prey; and it has been repreſented by their authors as the moſt tremendous paſſage in the world. Ariſtotle gives

gives a long and a formidable deſcription of it in his 125th chapter De Admirandis. It is deſcribed by Homer, 12th Odyſſey; Virgil, 3d Æneid; Lucretius, Ovid, Salluſt, Seneca, as alſo by many of the old Italian and Sicilian poets, who all ſpeak of it in terms of horror; and repreſent it as an object that inſpired terror, even when looked on at a diſtance. It certainly is not now ſo formidable: and very probably, the violence of this motion, continued for ſo many ages, has by degrees worn ſmooth the rugged rocks, and jutting ſhelves, that may have intercepted and confined the waters. The breadth of the Straits too, in this place, no doubt is conſiderably enlarged. Indeed, from the nature of things it muſt be ſo; the perpetual friction occaſioned by the current muſt wear away the bank on each ſide, and enlarge the bed of the water.

Veſſels in this paſſage are obliged to go as near as poſſible to the coaſt of Calabria, in order to avoid the ſuction occaſioned by the whirling of the waters in this vortex; by which means, when they come to the narroweſt and moſt rapid part of the Straits betwixt Cape Pelorus and Scylla, they were in great danger of being carried upon that rock. Hence aroſe the proverb which is ſtill applied to thoſe, who in attempting to avoid one evil fall into another: "Incidit in Scyllam, cupiens evitare Caribdem." There is a fine fountain of white marble on the key, repreſenting Neptune holding Scylla and Charybdis chained, under the emblematical figures of two ſea-monſters, as repreſented by the poets.

The little neck of land, forming the harbour of Meſſina, is ſtrongly fortified. The citadel, which is indeed a very fine work, is built on that part which connects it with the main land. The farthermoſt point, which runs out to ſea, is defended by four ſmall forts, which command the entry into the harbour. Betwixt theſe lie the the lazaret, and a light-houſe to warn ſailors of their approach to Charybdis, as that other on Cape Pelorus is intended to give them notice of Scylla. It is probably from theſe light-houſes (by the Greeks called *Pharoi*) that the whole of this celebrated Strait has been denominated the Faro of Meſſina.

There are a number of gallies and galliots in this beautiful harbour, which add greatly to its beauty. Theſe veſſels make a very picturesque appearance as they go out of the harbour; their oars moving all together, with the greateſt regularity. There are nine or ten men to each oar; they all riſe at every ſtroke of the oar, and, when they pull, they almoſt throw themſelves on their backs, and ſeem to exert their utmoſt force. Theſe wretches are chained to their oars, and ſleep every night on the bare benches, without any thing to throw over them. Yet, what is ſtrange, notwithſtanding all the miſery they ſuffer, we are told there was never known an inſtance of any of them putting themſelves to death.

There are fine ſhady walks on all ſides of Meſſina; ſome of theſe run along the ſea-ſhore, and are for ever fanned by the cooling breeze from the Straits. The houſes are large, and moſt of the articles of life are cheap and in plenty; particularly fiſh, which are reckoned better here than any where elſe in the Mediterranean. The hire of lodgings is next to nothing; and Brydone is of opinion, that there is no place ſo admirably calculated for the reſidence of that flock of valetudinarians, which every autumn leave our country with the ſwallows, in ſearch of warm climates. Their winter ſeaſon, in

general, is preferable to that of Naples. They have ſometimes heavy rain for two or three weeks; but it never laſts longer; and beſides, they have always ſome fair hours every day, when people can go out for exerciſe; for the moment the rain is over, the walks are dry, the ſoil being a light gravel.

After ſeeing the beautiful harbour of Meſſina, there is little worthy of notice in the city. Some of the churches are handſome, and there are a few tolerable paintings. This place is held in great veneration by the reſt of Sicily, for the aſſiſtance it gave to Count Rugiero in freeing the iſland from the yoke of the Saracens; in conſideration of which, great privileges were granted it by the ſucceeding kings; ſome of which are ſaid ſtill to remain. It was here that the Normans landed; and this city, by the policy of ſome of its own inhabitants, was the firſt conqueſt they made; after which their victorious arms were ſoon extended over the whole iſland; and a final period put to the Saracen tyranny. Count Rugiero fixed the ſeat of government at Palermo; and put the political ſyſtem of the iſland upon a ſolid baſis; of which the form (and the form alone) ſtill remained in 1798. He divided the whole iſland into three parts; one he gave to his officers, another to the church, and a third he reſerved for himſelf. Of theſe three branches he compoſed his parliament, that reſpectable body, of which the ſkeleton only now exiſts: for it has long ago loſt all its blood, nerves, and animal ſpirits; and for many ages paſt has been reduced to a perfect caput mortuum. The ſuperſtitious tyranny of Spain has not only deſtroyed the national ſpirit of its own inhabitants, but likewiſe that of every other country which has fallen under its power.

OF THE EXERCISE OF CHILDREN.

OF all the cauſes which conſpire to render the life of man ſhort and miſerable, none has greater influence than the want of proper exerciſe. Healthy parents, wholeſome food, and proper clothing, will avail little, where exerciſe is neglected. Sufficient exerciſe will make up for ſeveral defects in nurſing; but nothing can ſupply the want of it. It is abſolutely neceſſary to the health, the growth, and the ſtrength, of children.

The deſire of exerciſe is coeval with life itſelf. Were this principle attended to, many diſeaſes might be prevented. But, while indolence and ſedentary employments prevent two thirds of mankind from either taking ſufficient exerciſe themſelves, or giving it to their children, what have we to expect but diſeaſes and deformity among their offſpring?—The rickets, ſo deſtructive to children, never appeared in Britain till manufactures began to flouriſh, and people, attracted by the love of gain, left the country to follow ſedentary employments in great towns. It is amongſt theſe people that this diſeaſe chiefly prevails, and not only deforms, but kills, many of their offſpring.

The conduct of other young animals ſhews the propriety of giving exerciſe to children. Every other animal makes uſe of its organs of motion as ſoon as it can, and many of them, even when under no neceſſity of moving in queſt of food, cannot be reſtrained without force. This is evidently the caſe with the calf, the lamb, and moſt other young animals. If theſe creatures were not permitted to friſk

about, and take exercise, they would soon die or become diseased. The same inclination appears very early in the human species; but, as they are not able to take exercise themselves, it is the business of their parents and nurses to assist them.

Children may be exercised various ways. The best method, while they are light, is to carry them about in the nurse's arms. This gives the nurse an opportunity of talking to the child, and of pointing out every thing that may please and delight its fancy. Besides, it is much safer than swinging an infant in a machine, or leaving it to the care of such as are not fit to take care of themselves. Nothing can be more ridiculous than to set one child to keep another: this conduct has proved fatal to many infants, and has rendered others miserable for life.

When children begin to walk, the safest and best method of leading them about is by the hands. The common way of swinging them in leading-strings fixed to their backs, has several bad consequences. It makes them throw their bodies forward, and press with their whole weight upon the breast:—by this means the breathing is obstructed, the breast flattened, and the bowels compressed; which must hurt the digestion, and occasion consumptions of the lungs, and other diseases.

It is a common notion, that, if children be set upon their feet too soon, their legs will become crooked. There is reason to believe that the very reverse of this is true. Every member acquires strength in proportion as it is exercised. The limbs of children are weak indeed, but their bodies are proportionably light; and, had they skill to direct themselves, they would soon be able to support their own weight.—Who ever heard of any other animal that became crooked by using its legs too soon? Indeed, if a child be not permitted to make use of its legs till a considerable time after the birth, and be then set upon them with its whole weight at once, there may be some danger; but this proceeds intirely from a child's not having been accustomed to use its legs from the beginning.

Mothers of the poorer sort think they are great gainers by making their children lie or sit while they themselves work. In this they are greatly mistaken. By neglecting to give their children exercise, they are obliged to keep them a long time before they can do any thing for themselves, and to spend more on medicine than would have paid for proper care.

To take care of their children, is the most profitable business in which even the poor can be employed:—but, alas, it is not always in their power: poverty often obliges them to neglect their offspring in order to procure the necessaries of life. When this is the case, it becomes the interest as well as the duty of the public to assist them. Ten thousand times more benefit would accrue to the state, by enabling the poor to bring up their own children, than from all the hospitals that ever can be erected for their relief.

Whoever considers the structure of the human body, will soon be convinced of the necessity of exercise for the health of children. The body is composed of an infinite number of vessels, whose fluids cannot be pushed on without the action and pressure of the muscles. But, if the fluids remain inactive, obstructions must happen, and the humours will of course be vitiated, which cannot fail to occasion diseases. Nature has furnished both the vessels which carry the blood

blood and lymph with numerous valves, in order that the action of every muſcle might puſh forward their contents; but without action this admirable contrivance can have no effect. This part of the animal œconomy proves to a demonſtration the neceſſity of exerciſe for the preſervation of health.

Arguments to ſhew the importance of exerciſe might be drawn from every part of the animal œconomy.—Without exerciſe the circulation of the blood cannot be properly carried on, nor the different ſecretions duly performed: without exerciſe the humours cannot be properly prepared, nor the ſolids rendered ſtrong or firm. The action of the heart, the motion of the lungs, and all the vital functions, are greatly aſſiſted by exerciſe. But, to point out the manner in which theſe effects are produced, would lead us farther into the œconomy of the human body, than moſt of thoſe for whom this ſlight eſſay is intended would be able to follow. We ſhall therefore only add, that, where exerciſe is neglected, none of the animal functions can be duly performed; and, when that is the caſe, the whole conſtitution muſt go to wreck.

ACCOUNT OF A FIERY-METEOR, SEEN IN GASCONY, IN JULY 1790; BY M. BAUDIN, PROFESSOR OF PHILOSOPHY AT PAU.

ABOUT half an hour after ten o'clock on Sunday evening, July 24, 1790, as I was walking in the court of the caſtle of Mormes, along with M. de Carrits Barbotan, the atmoſphere being perfectly calm and ſerene, and not a cloud to be ſeen, we found ouſelves ſurrounded, all of a ſudden, by a whitiſh clear light, which obſcured that of the moon, though the latter ſhone with great luſtre, as it wanted only thirty hours of being at the full. On looking upwards we obſerved, almoſt in our zenith, a fire-ball of a larger diameter than the moon. It had behind it a tail, the length of which ſeemed to be equal to about five or ſix times the diameter of the body: at the place where it was connected with the body it had about the ſame breadth, and decreaſed gradually till it ended in a point. The ball and the tail were of a pale white colour; but the point of the latter was almoſt as red as blood. The direction of this meteor, which proceeded with great velocity, was from ſouth to north.

Scarcely had we looked at it for two ſeconds when it divided itſelf into ſeveral portions of conſiderable ſize, which we ſaw fall in different directions, and almoſt with the ſame appearance as the burſting of a bomb. All theſe different fragments became extinguiſhed in the air, and ſome of them, in falling, aſſumed that blood-red colour which I had obſerved in the point of the tail. It is not improbable that all the reſt may have aſſumed the ſame colour; but I remarked only thoſe which proceeded in a direction towards Mormes, and which were particularly expoſed to my view.

About three or perhaps two minutes and a half after, I am not certain which, as I was not reflecting upon what might be the conſequences, and therefore did not look at my watch, we heard a dreadful clap of thunder, or rather exploſion as if ſeveral large pieces of ordnance had been fired off together. The concuſſion of the atmoſphere by this ſhock was ſo great that we all thought an earthquake had taken place. The windows ſhook in their frames,

and fome of them, which probably were laid-to and not clofely fhut, were thrown open. We were informed next day, that in fome of the houfes at Houga, a fmall town about half a mile diftant from Mormes, the kitchen utenfils were thrown from the fhelves, fo that the people concluded there had been an earthquake. But, as no movement was obferved in the ground below our feet, I am inclined to think that all thefe effects were produced merely by the violent concuffion of the atmofphere.

We proceeded into the garden, while the noife ftill continued, and appeared to be in a perpendicular direction above us. Some time after, when it had ceafed, we heard a hollow noife, which feemed to roll along the chain of the Pyrenees, in echoes, for the diftance of fifteen miles. It continued about four minutes, becoming gradually more remote, and always weaker; and at the fame time we perceived a ftrong fmell of fulphur.

While we were endeavouring to point out to fome perfons prefent the place where the meteor had divided itfelf, we obferved a fmall whitifh cloud, which arofe perhaps from the vapour of it, and which concealed from us the three ftars of the great bear lying in the middle of thofe forming the femicircle. With fome difficulty, however, we could at laft diftinguifh thefe ftars again behind the thin cloud. There arofe, at the fame time, a frefh gentle breeze.

From the time that elapfed between the burfting of the ball and the explofion which followed, I was inclined to think that the meteor was at the height of, at leaft, feven or eight miles, and that it fell four miles to the north of Mormes. The latter part of my conjecture was foon confirmed, by an account which we received, that a great many ftones had fallen from the atmofphere at Juliace, and in the neighbourhood of Barbotan. One of thefe places lies at the diftance of about four miles to the north of Mormes, and the other at about the diftance of five to the north-north-weft.

M. de Carrits Barbotan, who was at Juliac two days after, confirmed to us the truth of this circumftance; and it appeared from the accounts of feveral intelligent perfons, highly worthy of credit, that the meteor burft at a little diftance from Juliac, and that the ftones which fell were found lying in an almoft circular fpace, about two miles in diameter. They were of various fizes. I have not heard of any houfes being damaged, though fome of the ftones fell into courts and gardens. In the neighbouring woods fome branches were found broken and torn by the falling of the ftones, which as they defcended made a ftrong whiftling noife that many perfons heard. I was told alfo by people of refpectability, that as the meteor proceeded in its courfe they heard a rufhing noife and fnapping, like that of electrical fparks; which appears to me very natural, though they were heard neither by myfelf nor M. de C. Barbotan.—Some ftones were feen to fall, which, when found, weighed 18 or 20 pounds, and which had funk into the earth from two to three feet. I was told alfo that fome were found which weighed fifty pounds. M. de C. Barbotan procured one weighing eighteen pounds, which he tranfmitted to the Academy of Sciences at Paris. I examined a fmall ftone which was brought to me, and found it very heavy in proportion to its fize: it was black on the outfide; of a greyifh colour in the infide, and interfperfed a number of fmall fhining metallic particles. On ftriking it with a piece of fteel, it produced

produced a few ſmall dark red ſparks, not very lively. A mineralogiſt, to whom a like piece of ſtone from the ſame meteor was ſhewn at Paris, deſcribed it as a kind of grey ſlag mixed with calcareous ſpar, the ſurface of which exhibited vitrified blackiſh calx of iron. I was told alſo that ſome ſtones were found totally vitrified.

This meteor was ſeen at Bayonne, Auch, Pau, Tarbes, and even at Bourdeaux and Thoulouſe. I learned that in the laſt-mentioned place it excited no great attention; which is not ſurpriſing, when we conſider the great diſtance. It appeared there only ſomewhat brighter than thoſe ſhooting ſtars which are ſeen from time to time; and after it burſt, there was heard a hollow report almoſt like a diſtant clap of thunder.

Had it been accurately obſerved at Auch and Pau what ſtars were obſcured by the vapour that aroſe from the burſting of the meteor, the real height of it might have been thence determined with preciſion.

Such, ſays Profeſſor Chladni, is the account given by Baudin of this meteor; the phenomena of which he endeavours to explain from accumulations in the upper parts of the atmoſphere.

According to all the obſervations hitherto made with any accuracy on fire-balls, the height at which they were firſt perceived was always very conſiderable; and, by comparing the angles under which they were ſeen from different points, often nineteen German miles, and even more; their velocity, for the moſt part, ſeveral miles in a ſecond; and their ſize always very great, often a quarter of a mile and even more in diameter. They were all ſeen to fall moſtly in a oblique direction: not one of them ever proceeded upwards. All of them have appeared under the form of a globular maſs, ſometimes a little extended in length and highly luminous; having behind it a tail, which, according to every appearance, was compoſed of flames and ſmoke. All of them burſt after they were ſeen to move through a large ſpace, ſometimes over ſeveral diſtricts, with an exploſion which ſhook every thing around. In every inſtance where there has been an opportunity of obſerving the fragments that fell after they burſt, and which ſometimes have ſunk to the depth of ſeveral feet into the earth, they were found to conſiſt of ſcorious maſſes which contained iron in a metallic or calcined ſtate, pure, or elſe mixed with different kinds of earth and ſulphur. All the ancient and modern accounts, written partly by naturaliſts and partly by others, are ſo eſſentially ſimilar, that the one ſeems to be only a repetition of the other. This conformity in accounts, the authors of which knew nothing of thoſe given by others, and who could have no intereſt in fabricating ſimilar tales, can ſcarcely have ariſen from accident or fiction, and gives to the related facts, however inexplicable many of them may ſeem, every degree of credibility. In my eſſay on the maſs of iron found by Profeſſor Pallas in Siberia, and others of the like kind, and ſeveral natural phenomena therewith connected, I have collected the principal obſervations made on fire-balls and the falling of ferruginous ſcorious maſſes obſerved at the ſame time, and have given a kind of explanation, which, however romantic it may ſeem, yet agrees better, in my opinion, with the facts hitherto obſerved than any other, and is contrary to no law of nature hitherto known. Some critics, as well as others, have ridiculed my ſingular hypotheſis, or condemned it altogether; but no one has yet confuted my principles, or given any

other explanation that correſponds ſo well with facts. On the other hand, I could mention ſeveral naturaliſts, who, as I know from their own mouths, agree with me in the eſſential parts of my explanation, did I not conſider it improper to bring them thus forward to public notice without their expreſs permiſſion. The ſtrongeſt objection made to my aſſertions is, that ſuch a maſs, from ſuch a prodigious height, would not ſink to the depth of a few feet, but to the centre of the earth. This aſſertion, however, contradicts itſelf; becauſe ſuch a maſs is not ſolid, as may be concluded from the variation of its form ſo often remarked, and the increaſe of its ſize till it at length burſts; but conſiſts of ſoft and elaſtic fluids, which, probably being expanded by the heat, extends to a monſtrous globular form; is then ſupported by the atmoſphere, and loſes the greater part of its gravity. To this may be added, that a ſoft tough maſs, which beſides falls in a very oblique direction, would not in general ſink ſo far into the earth as a ſolid maſs that falls in a perpendicular direction.—The above-deſcribed meteor ſeems, in every point of view, to confirm my method of explanation as much as if it had abſolutely taken place for that purpoſe. This much, at any rate, is proved, that all the phenomena which accompany fire-balls, as well as the falling of maſſes of ferruginous earth and ſulphureous maſſes, obſerved at the ſame time, cannot be explained from accumulations in the upper regions of the atmoſphere, as it can hardly be ſuppoſed that ſuch groſs ſubſtances could float or be diſſolved in ſo rarefied air at a height of twenty German miles, ſo as to be collected and to unite into monſtrous maſſes. As we are acquainted with no power which is able to force ſuch large bodies to ſo conſiderable a height, and then to give them an oblique movement downwards, and ſometimes almoſt horizontal, with a velocity which is equal to that of the planets in their orbits; and as no ſuch maſs has ever been ſeen to aſcend; they appear not to be terreſtrial, but coſmical bodies. Should this not be admitted, it is much to be wiſhed that ſome other perſon might give an explanation conſiſtent with the obſerved facts; and that more attention than has hitherto been beſtowed, were paid to the obſervation of fire-balls and ſhooting ſtars; as for example, that obſerved on the 8th of March 1796 in Luſatia, and in ſome parts of Saxony and Brandenburg.

Shooting ſtars are perhaps meteors of the ſame nature as thoſe teleſcopic ſparks of light obſerved by Mr. Schröter, and may be different from fire-balls only in this, that they move at a much greater diſtance from our earth, and that they do not fall, but only occaſion a tranſient luminous appearance in their paſſage through the upper regions of the atmoſphere.

I ſhall here mention an idea which does not proceed from myſelf, but from a very intelligent aſtronomer, that ſhooting ſtars might be employed to determine the difference of two meridians. Two or more aſtronomers, reſiding at ſome diſtance from each other, might agree to make obſervations on ſhooting ſtars, which appear almoſt at all times, when the weather is clear, in ſome part of the heavens, not with inſtruments, but merely with the naked eye; and to remark, not only the time of their appearance, but alſo their apparent courſe; and, from the difference of the times of ſeeing theſe ſhooting ſtars, the difference of the meridians of the places might be determined; and, from the difference of their apparent courſes, their real height and real courſe might be diſcovered.

ORIGIN

ORIGIN OF THE YELLOW FEVER IN NORTH AMERICA.

THE yellow fever, like the plague, is certainly a diforder originating in the warm climates of Afia or Africa, from whence both of them may be clearly traced; the plague itfelf was firft introduced into Europe, in fome degree, by the armies returning from the crufades, but chiefly by commerce; for many ages it ravaged moft of the European cities, particularly the commercial ones; in London it prevailed fourteen different times, with dreadful violence, between the reigns of Edward III. (when it was firft introduced) and George I. when the quarantine laws were paffed; thefe inftitutions, which feem to have been generally adopted about the laft period, have ever fince preferved Europe from the plague, and confined it to the countries of the Eaft, where the warmth of climate, and manners of the people, ftill keep it conftantly alive.

In a fimilar manner the yellow fever was introduced into the Weft Indies by the African fhips, and has now become general in the iflands, whofe warm climate keeps it in continual exiftence; in time of peace, the eafe of removing from it renders it little dreaded, and prevents its extenfion; but, during a war, when the inhabitants are confined in befieged towns, and fleets and armies maintained in fituations fo favourable to difeafe as fhips, camps, barracks, and hofpitals, it rages with uncontroulable violence.

Europe is preferved from it by the length of the voyage from the Weft Indies, and perhaps by the fleets arriving generally in feafons fufficiently cold or damp to check it; but the immenfe commerce of the United States, with the fhortnefs of the voyage, which is little more than a fortnight, renders the Weft Indies to them the fame fource of contagion that the Levant is to Europe.

During the prefent war, though the fever has ravaged moft of the iflands, it has been more feverely felt in the French, particularly Guadaloupe and St. Domingo, which have been the principal fcenes of military operation. With thefe iflands the American commerce has been chiefly conducted to a degree far beyond all former times: as it confifted very much in carrying provifions, it has been profecuted to ports and fleets in fuch fituations as to render it impoffible to efcape contagion; and the veffels in their return being generally crowded with paffengers, with baggage, and every fpecies of goods, have perhaps conftantly conveyed it home: when it has arrived during the winter, or moderate feafons, it has doubtlefs been deftroyed; but during the heat of fummer, it has produced the ravages we have heard of.

Although advantage has been taken of every circumftance which could admit of doubt and difficulty that might be fuppofed to occur, in tracing the origin of the fever in fome inftances, from the crews of veffels being difperfed, or goods fold to a variety of different perfons and places diftant from the fpot where they were firft landed, fo that the contagion might appear in many places at once, yet there is not only the moft pofitive proofs of the introduction of it in this manner, in every inftance where it has attacked the United States, but the ftrongeft collateral evidence, arifing from the identity of the diforder, and from a variety of other facts.

The

The idea of its originating in the United States was firſt mentioned by a phyſician of Philadelphia, in 1793, who is remarkable for the eccentricity and enthuſiaſm of his ſyſtems, which were proſecuted almoſt to a degree of inſanity, contrary to the general opinion of the faculty, and the good ſenſe of the citizens at large: to theſe ſyſtems every fact was perverted or overlooked. Unfortunately too, the rivalſhip and jealouſy of the other towns of the continent, for a city which was ſo eminently leading in its commerce and population, at firſt led them to attribute the fever to cauſes exiſting there, until they were themſelves attacked by it, and found from whence it originated; thus the opinion has been circulated, to an extent ſcarcely to be reached by the numerous facts which diſprove it.

In examining the origin of the yellow fever, it is neceſſary ſtrictly to diſcriminate it from diſeaſes of an inferior tribe, ſuch as intermittent, bilious, and putrid, fevers, gaol fevers, and others of the like kind. Theſe undoubtedly originate from cauſes immediately depending on reaſon, or local ſituation; and the cities of the United States are ſubject to them in the ſame manner, though not in a greater degree than thoſe of Europe; but the yellow fever, which is unqueſtionably of the ſame tribe as the plague, is not only traced like that diſorder, and the ſmall pox, by a regular proceſs of contagion, but is ſo different, and ſo far more extenſive in its effects, that, whenever it has appeared, it is marked with characters which prove its entire diſtinction from the tribe of local diſeaſes.

Though the yellow fever is a diſorder of the ſame claſs as the plague, it is far inferior in malignity; no time or art has materially leſſened the deſtruction of the plague, even in thoſe countries where it conſtantly exiſts; while the yellow fever is ſo much reduced in the Weſt Indies to the power of medicine, as not to be dreaded by the natives, more than other diſorders, and is chiefly fatal to ſtrangers. Its extenſive effects in North America might perhaps be adduced as one proof of its novelty and origin from a foreign cauſe; but, even in its worſt appearance, the proportion of individuals who recover is conſiderable; and in 1793, it was known to attack whole families, without the loſs of a ſingle perſon.

No regulations in Europe proved effectual to relieve its cities from the plague until quarantines were generally adopted, and many ages paſſed before they were eſtabliſhed with ſuch rigour as to render them effectual: the dreadful prevalence of the diſeaſe at Marſeilles, and other towns, in the beginning of the preſent century, ſeems at laſt to have occaſioned the preſent laws, which are, perhaps, the moſt ſevere and beſt executed of any that exiſt; the partial regulations of the kind in the United States have doubtleſs been attended with very good effects, but as yet they have never been adopted with the rigour of Europe, and evaſions have been too little noticed, or puniſhed.

The cities of the United States have now exiſted, many of them, near two centuries, and Philadelphia itſelf more than one; during this period, by clearing and cultivating the country, they have overcome all the natural diſadvantages of new ſituations, and have decreaſed in local and autumnal diſorders, inſomuch that their bills of mortality prove them to be as healthy in general as the cities of Europe; but at no period ſince their exiſtence have they been ravaged by diſorders ſimilar to the yellow fever, until within a few years

years paſt—it is impoſſible therefore to ſuppoſe, that a climate which for ſo many years, and under more diſadvantages than it now labours, could thus all at once engender diſeaſes, of which the hiſtory of mankind does not furniſh a ſimilar inſtance.

In the year 1760, during the French war, the yellow fever firſt appeared at Philadelphia, and was traced to ariſe from the clothes of a young man who died of it in Jamaica, which were ſent to his friends in Philadelphia; thoſe friends were the firſt who died of it, and, though it extended to others, its ravages were not very extenſive.

It was not afterwards known in America until the year 1793, when, in the month of June, a great number of veſſels, which were at Cape François during the dreadful capture of it by the negroes, brought away from it all the wretched inhabitants that eſcaped: many of theſe veſſels arrived at Philadelphia in July, full of paſſengers, and goods of every deſcription; in the latter end of the ſame month the fever broke out in the lodging-houſes which accommodated the crews of thoſe veſſels, and among the ſhipwrights who repaired them—ſo minutely was this fact inveſtigated, that the firſt perſons who died of it were the ſailors from thoſe lodging-houſes, and nearly all the families of one or two ſhip-carpenters in whoſe yards the veſſels were refitted.

The quarantines which were immediately eſtabliſhed, and the attention to every circumſtance that could increaſe the health of the city, and prevent communication, probably preſerved it for the enſuing four years, as it did not appear there again until 1797; in the mean time, however, other towns were attacked by it.

In 1794 it appeared at Baltimore, where it was brought by a veſſel from the Weſt Indies; it broke out, and was nearly altogether confined to a part of the town ſeated on a high point of land, and on a wide river, which forms the port, diſtant near a mile from the city itſelf, to which it was ſcarcely communicated.

In 1795 it appeared in New York, when it was alſo traced to have ariſen from a Weſt-India veſſel.

In 1797 it again appeared in Philadelphia, and was clearly traced to a veſſel from St. Domingo, as it broke out at the quay where ſhe was unladen, and among the merchants and others who were about her; on this occaſion much blame ſeems to have been imputed to the phyſician of the port, and to the want of proper vigilance in the health-officers.

During the late ſummer it has appeared, not only in Philadelphia and New York, but in many other of the commercial towns, in all of which it is not only traced to the cauſes here mentioned, but the following facts have occurred to ſupport its foreign origin:

Firſt, It has appeared in no town which has not had ſome immediate connection with the Weſt Indies.

2dly, Since the veſſels from the Weſt Indies have been prevented reaching Philadelphia, it has broke out in all the little towns and outports on the river Delaware, where they have been obliged to unlade their cargoes; while it has never appeared either in the country towns near them, or thoſe near the metropolis.

3dly, It has ravaged the ſmaller towns to which it has been thus introduced, nearly in as great a proportion as the great cities.

4thly, It has been more felt in the towns of the Middle and Northern States, in the moſt favourable ſituations, but who carry on

great trade, than in thofe of the Southern ftates, unqueftionably in lefs healthy climates, but with lefs commerce.

The hiftory of the plague, the fmall pox, and diforders of the fame tribe, are not only regularly traced, but the beft authorities agree, that they never originated in the cities of Europe, and that the caufes which create the fmaller difeafes are not adequate to produce them; but, of all the reafons affigned for the yellow fever being of local origin, there is none which is general to the many places in which it has appeared in the United States, nor any which do not exift in a far greater degree in moft European cities. Great population, crowded ftreets, filth, and want of common fewers, &c. if they exifted in the greater towns, could not influence the fmaller ones; and low or unhealthy fituations cannot be attributed to thofe which are fituated on bold promontories, and on the margin of the ocean; the climate of the United States, though hot, is not hotter than the middle and fouth of Europe, and it is corrected in winter by frofts far more continued and fevere.

A variety of reports which have exifted in Europe relative to the fituations of the cities of the United States, and to their conftruction, are untrue, and originate either in the fuppofition of thofe who were ignorant of them, or in the mifreprefentation of thofe who wanted other reafons to fupport the idea of the local origin of the yellow fever. In fact, rather than that credit fhould be given to the plain demonftration of its being an imported difeafe, numerous ftories have been propagated relative to their crowded conftruction, want of common fewers, and other caufes generally affigned as the fource of difeafe.

New York, and all the feaport towns in the Northern States, are built on fituations remarkably elevated, and expofed to the air of the fea. In their conftruction they are equal to any towns in Europe, and in no inftances fo thickly built; in general they are remarked for having few of the common autumnal complaints, and can boaft, perhaps, of as high health as any towns in the world.

The city of Philadelphia is at a confiderable diftance from the fea; though fituate on the banks of two noble rivers, it ftands on a fine open plain, equally elevated as London; and the country around it, on all fides but one, rifes into gentle hills, like thofe of Middlefex and Surry; on the river below it, are fome meadows, but they are equally drained, and cultivated, and by no means fo extenfive, as thofe on the Thames around London; its water is in general excellent; its ftreets are wide, well paved, and perfectly drained; a confiderable part of it is furnifhed with common fewers, and thofe parts to which they are not yet extended, have neither been fo long, or fo thickly fettled, as to experience inconvenience for want of them; its houfes are in general airy, and feldom contain more than one family; and the police of the city, the moral order and the cleanlinefs of its inhabitants, will yield to no one in Europe, if equalled by them.

After having feen moft of the European cities, we cannot but adduce them as proofs againft the local origin of diforders fimilar to the yellow fever; leaving the cities of the north of Europe, fituate in climates which might be fuppofed in fome degree to protect them, and in general of more cleanly habits, and with a better police, we fhall fpeak more particularly of thofe of the fouth of France and Italy, efpecially of Marfeilles, Milan, Genoa, and Leghorn. If improvements

provements have been introduced into thefe, they are certainly not fuch as have deftroyed the caufes ufually affigned for difeafe, and are confined to fuch parts of them as are newly conftructed; the narrow ftreets in the old parts of thofe towns are badly paved, and often not paved at all, thefe being the general receptacle of all filth, without the attention of a police to cleanfe them; the want of common fewers, the height and crowded conftruction of the houfes, the numerous families with which they are filled, the rooms feldom cleaned, and the walls covered with cotton and filk tapeftry, in lieu of plaifter, muft have ftruck the attention of all who have vifited them; if, then, under fuch unfavourable circumftances, thefe towns, thus fituated, in one of the hotteft climates, where the winters often have no froft, not only have never known either that or any diforder of the kind to originate among them, but have been able entirely to rid themfelves of the plague by their quarantines, and enjoy a high degree of health ever fince they were adopted, it affords the ftrongeft arguments againft the origin of the yellow fever in the towns of North America, and in favour of their being wholly relieved from it by the eftablifhment of fimilar regulations.

It is clearly demonftrable, that the difeafe does not remain in the cities of America from one year to another, but that, in each inftance, it is produced by frefh contagion; cold and rain have, in all inftances, totally deftroyed it, and, until 1798, it has never appeared twice in one place; in the year 1793, the 17th day of October was the moft fatal to the city of Philadelphia, and yet, by the 3d of November the diforder had wholly ceafed, and the inhabitants had returned as ufual; in the year 1798, though fo fatal in September, the citizens began to return by the laft of October, and, in all inftances, the rains and frofts of the autumn and winter have immediately deftroyed the contagion, and reftored the cities to their ufual health, without leaving a trace of the difeafe, or any return of it in the fucceeding fpring.

There are many perfons who, from a love of fpeculative theory, may endeavour to eftablifh oppofite opinions, and fome, perhaps, from a wifh to check the connexions with America. Already the differences among the medical faculty in America itfelf, both on the origin, the nature, and the treatment, of the difeafe, have been profecuted with an enthufiafm and rancour, which have proved one of the fevereft afflictions that has accompanied it, and has robbed the unhappy fufferer of all the comfort which confidence in a phyfician is capable of infpiring; thefe circumftances fhould teach the world to beware of information which they receive through fuch channels, and rather to truft the narratives of thofe perfons who form them with plain good fenfe, and an attention to facts, without having fyftems to eftablifh, or interefts to ferve. In judging of a calamity fo awfully afflicting to a country with whom we are allied by fo many ties, every humane mind will liften to thofe opinions which are founded on facts, bear a near refemblance to our own former experience, and, above all, appear the moft likely to be remedied. The unhappy inhabitants of America have already exhaufted almoft every effort in perfecting the internal police of their cities, until attention to cleanlinefs can do little more; had they been equally attentive to eftablifh general and rigorous quarantines, in all probability they would have been ere this free from the attacks of this dreadful

diſeaſe. Inſtead, therefore, of calling away their attention to deluſive theories, we ought to ſtrengthen them in the reſolution to adopt regulations which we found effectual ourſelves, and to cheer them by the hope that theſe will, under Providence, enſure their future ſafety.

EXTRACT FROM DR. JOHNSON'S SERMON ON THE DEATH OF HIS WIFE.

TO Chriſtians the celebration of a funeral is by no means a ſolemnity of barren and unavailing ſorrow, but eſtabliſhed by the church for other purpoſes.

Firſt, for the conſolation of ſorrow. Secondly, for the enforcement of piety. The mournful ſolemnity of the burial of the dead is inſtituted, firſt, for the conſolation of that grief to which the beſt minds, if not ſupported and regulated by religion, are moſt liable. They who moſt endeavour the happineſs of others, who devote their thoughts to tenderneſs and pity, and ſtudiouſly maintain the reciprocation of kindneſs, by degrees mingle their ſouls in ſuch a manner, as to feel, from ſeparation, a total deſtitution of happineſs, a ſudden abruption of all their proſpects, a ceſſation of all their hopes, ſchemes, and deſires. The whole mind becomes a gloomy vacuity, without any image or form of pleaſure; a chaos of confuſed wiſhes, directed to no particular end, or to that which, while we wiſh, we cannot hope to obtain ; for the dead will not revive ; thoſe, whom God has called away from the preſent ſtate of exiſtence, can be ſeen no more in it ; we muſt go to them ; but they cannot return to us.

Yet, to ſhew that grief is vain, is to afford very little comfort ; yet this is all that reaſon can afford ; but religion, our only friend in the moment of diſtreſs, in the moment when the help of man is vain, when fortitude and cowardice ſink down together, and the ſage and the virgin mingle their lamentations ; religion will inform us, that ſorrow and complaint are not only vain, but unreaſonable and erroneous. The voice of God, ſpeaking by his Son and his Apoſtles, will inſtruct us, that ſhe, whoſe departure we now mourn, is not dead, but ſleepeth ; that only her body is committed to the ground, but that the ſoul is returned to God, who gave it ; that God, who is infinitely merciful, who hateth nothing that he hath made, who deſireth not the death of a ſinner ; to that God, who only can compare performance with ability, who alone knows how far the heart has been pure, or corrupted, how inadvertency has ſurpriſed, fear has betrayed, or weakneſs has impeded ; to that God who marks every aſpiration after a better ſtate, who hears the prayer which the voice cannot utter, records the purpoſe that periſhed without opportunity of action, the wiſh that vaniſhed away without attainment, who is always ready to receive the penitent, to whom ſincere contrition is never too late, and who will accept the tears of a returning ſinner.

Such are the reflections to which we are called by the voice of truth ; and from theſe we ſhall find that comfort which philoſophy cannot ſupply, and that peace which the world cannot give. The contemplation of the mercy of God may juſtly afford ſome conſolation, even when the office of burial is performed to thoſe who have been ſnatched away without viſible amendment of their lives ; for who ſhall preſume to determine the ſtate of departed ſouls, to lay

open what God hath concealed, and to ſearch the counſels of the Moſt Higheſt?—but with more confident hope of pardon and acceptance, may we commit thoſe to the receptacles of mortality, who have lived without any open or enormous crimes; who have endeavoured to propitiate God by repentance, and have died at laſt with hope and reſignation. Among theſe ſhe ſurely may be remembered whom we have followed hither to the tomb, to pay her the laſt honours, and to reſign her to the grave; ſhe, whom many who now hear me have known, and whom none who were capable of diſtinguiſhing either moral or intellectual excellence could know without eſteem or tenderneſs. To praiſe the extent of her knowledge, the acuteneſs of her wit, the accuracy of her judgment, the force of her ſentiments, or the elegance of her expreſſion, would ill ſuit with the occaſion.

Let us therefore preſerve her memory for no other end but to imitate her virtues; and let us add her example to the motives to piety which this ſolemnity was, ſecondly, inſtituted to enforce.

It would not indeed be reaſonable to expect, did we not know the inattention and perverſeneſs of mankind, that any one who had followed a funeral, could fail to return home without new reſolutions of a holy life: for who can ſee the final period of all human ſchemes and undertakings, without conviction of the vanity of all that terminates in the preſent ſtate? For, who can ſee the wiſe, the brave, the powerful, or the beauteous, carried to the grave, without reflections on the emptineſs of all thoſe diſtinctions which ſet us here in oppoſition to each other? And who, when he ſees the vanity of all terreſtrial advantages, can forbear to wiſh for a more permanent and certain happineſs? Such wiſhes, perhaps, often ariſe, and ſuch reſolutions are often formed: but before the reſolution can be exerted, before the wiſh can regulate the conduct, new proſpects open before us, new impreſſions are received; the temptations of the world ſolicit, the paſſions of the heart are put into commotion; we plunge again into the tumult, engage again in the conteſt, and forget, that what we gain cannot be kept, and the life, for which we are thus buſy to provide, muſt be quickly at an end.

But, let us not be thus ſhamefully deluded! Let us not thus idly periſh in our folly, by neglecting the loudeſt call of Providence; nor, when we have followed our friends, and our enemies, to the tomb, ſuffer ourſelves to be ſurpriſed by the dreadful ſummons, and die at laſt amazed and unprepared! Let every one whoſe eye glances on this bier, examine what would have been his condition, if the ſame hour had called him to judgment, and remember, that, though he is now ſpared, he may, perhaps, be to-morrow among ſeparate ſpirits. The preſent moment is in our power; let us therefore, from the preſent moment, begin our repentance! Let us not, any longer, harden our hearts, but hear this day the voice of our Saviour and our God, and begin to do, with all our powers, whatever we ſhall wiſh to have done when the grave ſhall open before us! Let thoſe who came hither weeping and lamenting, reflect, that they have not time for uſeleſs ſorrow; that their own ſalvation is to be ſecured, and that the day is far ſpent, and the night cometh, when no man can work; that tears are of no value to the dead, and that their own danger may juſtly claim their whole attention! Let thoſe who entered this place unaffected and indifferent, and whoſe only purpoſe was

to

to behold this funeral ſpectacle, conſider that ſhe, whom they thus behold with negligence, and paſs by, was lately partaker of the ſame nature with themſelves; and that they likewiſe are haſtening to their end, and muſt ſoon, by others equally negligent, be buried and forgotten! Let all remember, that the day of man is ſhort, and that the day of grace may be much ſhorter; that this may be the laſt warning which God will grant us, and that, perhaps, he who looks on this grave unalarmed, may ſink unreformed into his own!

Let it, therefore, be our care, when we retire from this ſolemnity, that we immediately turn from our wickedneſs, and do that which is lawful and right; that, whenever diſeaſe or violence ſhall diſolve our bodies, our ſouls may be ſaved alive, and received into everlaſting habitations.

ON CONTENT. AN EASTERN TALE.

THAT univerſal diſcontent and diſquietude, which runs through every rank and degree of life, hath been deſervedly condemned by the philoſophers of all ages, as one of the bittereſt reproaches of human nature, as well as the higheſt affront to the divine Author of it. If, indeed, we look through the whole creation, and remark the progreſſive ſcale of beings as they riſe into perfection, we ſhall perceive, to our ſhame and confuſion, that every one ſeems ſatisfied with that ſhare of life and happineſs which its Maſter hath appointed for it, man alone excepted, who is pleaſed with nothing that his bounty imparts, unleſs bleſſed with every thing that his bounty can beſtow; perpetually repining at the decrees of Providence, and refuſing to enjoy what he *has*, from a ridiculous and never-ceaſing deſire for what he *has not*.

That object which is at a diſtance from us is always the moſt inviting: and that poſſeſſion the moſt valuable which we cannot acquire.—With the ideas of affluence and grandeur we are apt to aſſociate thoſe of joy and pleaſure; and, becauſe riches and power may conduce to our happineſs, we haſtily conclude they muſt do ſo. The pomp, ſplendour, and magnificence, which attend the great, are viſible to every eye; whilſt the ſorrows which they feel, and the dangers they are obnoxious to, eſcape obſervation.

Hence it ariſes, that almoſt every condition and circumſtance of life is conſidered as preferable to our own; that we ſo often fall in love with ruin, and beg to be unhappy; we weep, in ſhort, when we ought to rejoice, and complain when we ought to be thankful.

The ſun, ſays an eaſtern ſage, was ſinking behind the weſtern hills, and with departing rays gilded the ſpires and turrets of Golconda, when the captive Selima, from the window of the ſon of Nourdin's ſeraglio, caſting a mournful look at the country which ſhe ſaw at a diſtance, beyond the boundary of her confinement, fixed her eyes on ſome cottages which ſhe could diſtinguiſh by the thin ſmoke aſcending from them, and ſeemed to envy the humble condition of the lowly inhabitants. She longed to exchange her own ſituation for that of innocent poverty and cheerful tranquillity. Little by little the envied proſpect faded on her ſight, and ſhe liſtened with horror to the craſhing of iron bars, and the cloſing of the gates that ſurrounded her; till at length all was huſhed: all became quiet as the hours of night. She then burſt forth into the following ſoliloquy.

"And

"And was I formed a reasonable being," she cried, "for this? to be excluded for ever from society, and doomed to add one more to the slaves of the monarch of the east; have I deserved this at the hand of Providence, or merited this unequal lot from the genius of distribution? Did I ever turn my ears from the cries of the needy, or shut the open hand of mercy from the poor? Why then am I punished in this manner? Why for ever denied the blessing of mutual love, and fated to weep in vain to the walls of a prison-house? While I was a child, the angel of death closed the eyes of my parents, when as yet I knew not their loss; and a few moons ago the same minister of terror bore from my arms a sister whom I loved, to the land of silence and shadows; the rest of those that were dear to me, groan under the bonds of servitude in the mines of Agra, or traverse the great waters in the ships of India; some happier few, who have found favour in the eyes of the sultan, live only to shew me the difference between what I was and what I am; yet the remembrance of those I lost, I bore with resignation; I wept, indeed, and retired; but, as yet, I repined not. But to know no end of misery, to be kept as a witness to the luxury of those who were once our equals, is surely the worst suffering that can be inflicted. I have said to the slaves, Why will not my lord the sultan dismiss the maid whom he thinks unworthy his embraces, and whose presence will rather cast a cloud over his pomp than increase it? But they treat my tears and my remonstrances with scorn, nor are their hearts melted in them with pity: night and silence are over all the seraglio; even the horrid guards, to whose care we are resigned, are fast locked up in sleep: when, oh! when, shall I enjoy that sweet oblivion? Discontent and perpetual uneasiness of mind banish from my eyes all propensity to rest; the night only affords me an opportunity to vent my complaints, and my greatest happiness is this hour of universal repose, when I can, undisturbed and unmolested, give utterance to the sorrows of my heart."

As she pronounced these last words, the shades of darkness were suspended on a sudden, and a light diffused itself around her like the flash of mid-day. She looked up, and beheld, when Azazel, the angel of reproof, became visible to her sight. She bowed her head in the dust, and humbled herself before him. "Selima," he cried, "arise, thou misguided child of affliction! I am that genius who was with thee when thou wast as yet a child, and in my book were thy future fortunes written. I was with the angel whose ministry it was to seal the eyes of thy parents, and who laid his hands on thy sister. Under my influence wert thou brought as a captive unto Amurath from the banks of Oxus, and immured in the walls of his seraglio. Thou hast complained of thy fate; thou hast said that the eye of thy genius frowned on thy birth, and that misfortune has marked thee for her daughter: but I am come to clear thy doubts, and to direct thee where thou mayest find the mansions of rest. Let my words sink deep in thee, and engrave them in living characters on thy heart. I will take away the mist from before thine eyes, for thou knowest not what thou hast said. Thou hast lamented the fate of thy sister, who is happier than thou art, and who has her station assigned her in the realms of bliss. The situation of thy companions, who have appeared pleasing to the sultan, has been the object of thine envy; but, alas! thine is a paradise to theirs. Thou hast repined

pined at that ſolitude which, hadſt thou made a right uſe of it, would have taught thee to know thyſelf; and haſt grieved that thou wert not born to that beauty which thouſands poſſeſs, and which would have been to thee a puniſhment inſtead of a bleſſing. I will now ſhew thee what, but for my interpoſition, would have been thy own deſtiny, had this thy laſt, thy preſumptuous, wiſh been crowned with ſucceſs; hadſt thou been bidden in thy turn to deck with oriental pomp the bed for Amurath, and repoſe on the ſilken pavilions in the inner chambers of the palace. Turn thyſelf to the eaſt, and view there what I ſhall explain to thee."

She turned, and beheld a woman ſeated on a throne, ſurrounded with every circumſtance of eaſtern magnificence. She was as fair as one of the Houries, and ſparkling in the gold of Hindooſtan, and the diamonds of Surat. In her preſence every tongue was dumb, every knee bended with fear, and every eye was fixed on the ground; yet ſhe ſeemed to receive the adorations of the crowd with coldneſs, nor was her eye glad at the approach of her lord; ſhe ſeemed alone as to herſelf, though amidſt wondering thouſands, and with ten thouſands at her feet.—"View her yet again," he ſaid, "Selima, as the crowd retiring leaves her in her cloſet; and what happineſs does ſhe ſeem poſſeſſed of, that thou wouldſt wiſh to be thine. Does not that gloom that hangs on her brow owe its being to fear? Is ſhe not conſcious that treachery or chance can in a moment bring her licentious happineſs to an end? and guilt, that viper in her boſom, deſtroys all reliſh for pleaſure, and points out to her the vanity of all joys that have not virtue for their foundation. But ſee, the guards ruſh in at this moment to ſeize her, and accuſe her of having conſpired the death of her lord.—Mark how the ſplendid apartments and alcove of pleaſure diſappear, and in their ſtead the joyleſs gloom and grated windows of a priſon.—Now ſhe is hurried in, they throw the black robe of death upon her; in vain does ſhe now think of command, in vain wave that hand, which a few hours before would have ſtilled the raging of the people, and humbled the rulers of the world. She now begs to be heard, and has recourſe, as her laſt aids, to intreaty, tears, and proſtration, but in vain: ſhe is dragged down on the rocky pavement by the hands of ſlaves, who offer her the diſmal alternatives of the poiſoned cup, or the ſabre.—She drinks; and ſee, ſhe ſinks, yet and yet paler, to the earth.—See the laſt convulſive ſtruggle, the dying gaſp, and the ſigh that rends the heart in the laſt agony.—Scarcely is there a pauſe: they ſtrip the yet warm body, denied to be joined in burial with the queens of the land, and expoſe it for a prey to the eagle and vulture.—Such, ſhort-ſighted maid, would have been thy lateſt hour; and thy end would have reſembled hers. Bear, then, thy preſent fate without repining, nor daſh the cordial which hope preſents thee to the ground, but wait with patience for a happier hour. Their lot only may be called miſerable whoſe faces were never covered with ſhame, and who go down unrepenting to the grave.—Hope is yet thine, which can turn the walls that confine thee to the bower of content; then ſay not in thine heart, that thy portion here is with the wretched, nor, by wiſhing to alter the allotment of Providence, provoke the anger of a power infinitely greater than mine, which can cruſh thee to atoms at a blow."

When

When the genius had ſpoken theſe words, he ſtretched out his arm over her, and ſhe ſunk down on a ſofa into the arms of ſleep, from which ſhe awoke in the morning with a conviction of the unjuſtneſs of her repinings, and with a perfect reſignation to the lot which had been aſſigned to her in the terreſtrial abode of life.

ACCOUNT OF THE ZEBRA.

THE zebra has been miſtaken by many authors for the wild aſs, though it is quite a different animal. They are very common in the ſouthern parts of Africa, even as far as the Cape of Good Hope; but there are none in the northern. They are by ſome eſteemed the moſt beautiful quadruped yet known.

The male zebra is about the ſize of a mule, and its general ſhape is like that of a well-made horſe; except the ears being a little longer, but not quite ſo long as thoſe of the aſs; the mane ſhort, not hanging down like a horſe's, but erect; and the muzzle of a duſky colour. The head is ſtreaked with fine ſtripes of black and white, which in a manner centre in the forehead; the ears are alſo variegated with white and duſky brown; and the neck has broad ſtripes of the ſame dark brown running round it, which takes in the mane, leaving narrow white ſtripes between them. The body is ſtriped alſo acroſs the back with broad bars, leaving narrow ſpaces of white between them, and ending in points on the ſides of the belly, which is white, except a black line pectinated on each ſide, reaching from between the fore-legs along the middle of the belly two thirds of its length. There is a line of ſeparation between the trunk of the body and the hinder quarters on each ſide, behind which, on the rump, is a plat of narrow ſtripes joined together by a ſtripe down the middle of the rump to the end of the tail, forming the figure of a fiſh-bone. The tuft at the end of the tail is dark brown; and on the outſides of each thigh are drawn obliquely three bars of brown ending roundiſh at both ends. The tail is rather like the aſs's than the horſe's; having ſhort hair on it, except that at the end it has a long tuft; its under ſide is white; the legs are all encompaſſed with rings of white and brown, alternately in an irregular and broken manner. It is hoofed like a horſe, and the feet are brown a little way above the hoofs; all the marks are of a dark blackiſh brown, and all the ſpaces between them are white; they herd together in great droves, and are not very eaſily caught or tamed; however, ſome have actually been tamed, as appears from the female zebra that was in the poſſeſſion of the late Prince of Wales, at Kew; of which here follows the deſcription. This animal was brought alive, together with the male, from the Cape of Good Hope, and her general colour, excluſive of the ſtripes, which were all black, was of a bright bay on the head, neck, upper part of the body, and thighs; but the belly, legs, and the end of the tail, were white. On the joints of the legs it had ſuch corns as we ſee on horſes, and the hoofs were blackiſh. The head was ſtriped a little different from that of the male, and the mane was black and white; the ears were of a bay colour, and there was a little white on the forehead, with ſeveral broad ſtripes round the neck, which became narrow on its under ſide; it had a black liſt running along the ridge of the back and part of the tail, and another along the middle

middle of the belly; the ſtripes on the body proceeded from the liſt on the back, and ſome of them ended in forks on the ſides of the belly, others in ſingle points, and theſe had ſome longiſh ſpots between them. The upper part of the body was ſpotted in a more irregular confuſed manner, and the two ſides were marked very uniformly. The noiſe it made was much different from that of an aſs, reſembling more the confuſed barking of a maſtiff-dog: it ſeemed to be of a ſavage and fierce nature; for no one would venture to approach it, but a gardener in the prince's ſervice, who was uſed to feed it, and could mount on its back: it would eat fleſh, or any kind of food they offered it; and though it feeds naturally, as horſes and aſſes do, on vegetables, yet this, like them, was taught to live upon different food; and it is remarkable enough, that horſes themſelves may eaſily be taught to drink milk, eat eggs, and ſuch-like ſubſtances.

HISTORY OF POETRY.—*Suppoſed to have been written by Dr. Swift.*

SIR, in obedience to your commands, I here ſend you the following ſhort Eſſay towards a Hiſtory of Poetry in England and Ireland. At firſt it was a ſcience we only began to CHAW SIR. A hundred years after, we attempted to tranſlate out of the Pſalms, but could not our STERN-HOLD. In Queen Elizabeth's reign, I think, there was but one DI-SPENCER of good verſes; for his patron, though a great man, IS HID NIGH by the length of time. Yet, a little before her death, we attempted to deal in tragedy, and began to SHAKE SPEARS; which was purſued under King James I. by three great poets, in one of them in many a line ſo ſtrong, that you might make a BEAM ONT; the ſecond, indeed, gives us ſometimes but FLAT CHEER, and the third is BEN-ding a little to ſtiffneſs.

In the reign of King Charles I. there was a new ſucceſſion of poets; one of them, though ſeldom read, I am very fond of; he has ſo much ſalt in his compoſitions, that you would think he had been uſed to SUCK-LING: as to his friend, the author of Gondibert, I'D AVE AN AUNT write better. I ſay nothing againſt your favourite, though ſome cenſure him for writing too COOLY; but he had a rival whoſe happier genius made him ſtand like a WALL OR a pillar againſt cenſure.

During the Uſurpation we fell into burleſque; and I think whoever reads Hudibras, cannot BUT LEER. I have COT ONE more, who traveſtied Virgil, though not equal to the former.

After the Reſtoration, poets became very numerous; the chief, whoſe fame is louder than a MILL-TONE, muſt never be forgot. And here I muſt obſerve, that poets in thoſe days loved retirement ſo much, that ſometimes they lived in dens. One of them in a DRY DEN: another called his den his village, or DEN-HAM; and I am informed that the ſorry fellow, who is now Laureat, affects to USE-DENS ſtill: but, to return from this digreſſion, we were then famous for tragedy and comedy; the author of Venice Preſerved is ſeldom O'T AWAY; yet he who wrote the Rival Queens, before he loſt his ſenſes, ſometimes talked MAD-LEE. Another, who was of Ireland, went into England, becauſe it is more SOUTHERN, and he wrote tolerably well. I ſay nothing of the Satiriſt, with his OLD-DAM' verſes. As for comedy, the Plain Dealer, WHICH EARLY came into credit, is allowed on all hands an excellent piece: he had a dull contemporary, who

who sometimes shewed humour, but his colouring was bad, and he could not SHADE-WELL. Sir George, in my opinion, out-did them all, and was sharp at EITHER-EDGE. The Duke is also excellent, who took a BOOK IN GAME, and turned into ridicule, under the name of the Rehearsal It is, indeed, no wonder to find poetry thrive under the reign of that prince; when, by one of his great favourites who was likewise an excellent poet, there was a DORE-SET open for all men of wit. Perhaps you WILL-MUTT'er, that I have left out the Earl of Rochester; but I never was one of his admirers.

Upon the Revolution, poetry seemed to decline; however, I shall PRY O'R as many poets as I can remember. Mr. Montague affected to be a patron of wit, and his house was the poets HALL-I-FAX for several years, which one of them used to STEP-NIGH every day. Another of them, who was my old acquaintance, succeeded well in comedy, but failed when he began to CON GRAVE subjects. The rest came in a ROW.

The author of the Dispensary had written nothing else valuable, and therefore is too small in the GARTH. But may not a man be allowed to ADD IS OWN friend to the number? I mean the author of Cato.

To mention those who are now alive, would be endless; I will therefore only venture to lay down one maxim, that a good poet, if he designs to TICKLE the world, must be GAY and YOUNG; but, if he proposes to give us rational pleasure, he must be as grave as a POPE.

OF THE PRIMITIVE GRECIAN ARCHITECTURE.

THIS style of architecture is commonly called *Doric*, but might more properly be called *Grecian*, as being the only style employed, either in Greece, or its European colonies, prior to the Macedonian conquest; when all the distinctive characteristics of the different nations, which became incorporated in that empire, were, by the policy of the conqueror and his successors, gradually blended and lost in each other. Hence, from the combined tastes and habits of different countries, arose fanciful and capricious designs and compositions; and that restless desire of novelty, which has always been the bane of true taste. Prior to that period, all the temples of Greece, Sicily, and Italy, appear to have been of one order, and of one general form; though slightly varied in particular parts, as occasional convenience or local fashion might chance to require.

This general form was an oblong square, of six columns by thirteen, or eight by seventeen, inclosing a walled cell, small in proportion, which, in some instances, appears to have been left open to the sky, and in others, covered by the roof which protected the whole building. When the span of this roof was very wide, there appears in early times to have been a row of columns in the middle to support the rafters; the art of constructing any thing on the principle of an arch, even in wood, being then unknown. This seems to have been the case with all buildings of considerable magnitude in the time of Homer; who, in the Odyssey, frequently speaks of columns in the middle of the room; though, in a passage of the Iliad, he mentions the fixing of rafters for a roof, so as to form an angle, and support each other.

The ornamental part of this architecture (the Doric), or that which properly distinguishes it as an order, is extremely simple, and such as necessarily resulted from the mechanism of the structure. The columns represented posts, or trunks of trees, placed on a basement of stone, to prevent them from sinking into the ground, or being decayed by the wet, and they were regularly tapered from the bottom to the top, as trees are by nature: channels, or flutes, were cut in them, to hold the spears or staves which the early Greeks always carried: and on the tops were placed round stones, to protect them from the rain; and above, square ones, to receive the beam which supported the rafters of the ceiling. This beam became the architrave; while the ends of the rafters resting upon it, being scored or channelled to prevent the rain from adhering to them, became the triglyphs; the drops of which represent the drops of water distilling from them. The cornice was the projecting part of the roof; and the blocks, the ends of the rafters which supported it. Some of these decorations, indeed, though employed at first merely as the natural result of the most obvious and primitive mode of building, were afterwards adapted, by slight alterations, to that symbolical language, which all the ornaments of the sacred buildings of antiquity were intended, in different modes, to express; but as the explanation of this belongs rather to the religion than the architecture of those times, it forms no part of the present subject. Our modern sophists have questioned all the accounts of the energy, power, and population, of the ancients; and thus endeavoured to subvert all the authority of ancient history. The learned and elaborate essay of a late very acute and ingenious sceptic (Hume) on this subject, is well known; but without entering into any critical discussions concerning the corruptions of texts, or the uncertainty of numerals in the Greek historians; or repeating any of the common-place accusations of their dispositions to exaggerate; we may, in answer to all the sceptical reasoning that human ingenuity can produce, point to the vast remains of splendour and power in the mouldered ruins of their public buildings; not only in the great ruling states, such as Athens, Corinth, and Syracuse; but in little obscure republics, such as Pæstum, Segesta, and Selinus, whose names alone can be gleaned from history by the diligence of the antiquary; yet has the last and most obscure of these little states, left buildings, which surpass in size, strength, and solidity of the construction, not only all that the greatest potentates of modern times have been able to accomplish; but all that was ever produced by the unlimited resources and unlimited despotism of the Roman emperors. The portico of the great temple of Selinus, in Sicily, which is one of the six still remaining, prostrate and in ruins, on the site of that city, consisted of a double peristyle of eight columns in front, and seventeen in depth; each of which was ten feet in diameter, and fifty feet high.

Were it not for such remaining testimonies as these, of which we now offer examples to the public, the measurements of buildings, given by Herodotus and Diodorus, would have been deemed as fabulous as their military musters or civil computations. We should have been asked triumphantly, Whence came the artists, tools, and provisions? or from what resources did little barren states, destitute alike of any foreign trade, or foreign dominions, that we know or ever heard of, find means to maintain, in unproductive labour, such

ſuch immenſe numbers of hands as ſuch buildings muſt neceſſarily have required?

To this we could have given no anſwer; and can give none now, but by pointing to the vaſt piles that ſtill reſiſt the deſtructive waſte of time, and more deſtructive malignity of man; and bidding them atteſt the truth, and vindicate the character of venerable hiſtorians from the cavils of that petulant ingenuity, which is ever labouring to perplex where it cannot inſtruct, and to thicken darkneſs where it cannot diffuſe light. We do not pretend, however, to aſſert that all theſe great ſtructures were the ſeparate works of the particular ſtates, in whoſe territory we find them: on the contrary, we know that the Greeks had many cathedral or amphictyonic temples, each built and kept up at the common expence of ſeveral confederate ſtates; who at ſtated times offered joint ſacrifices at it, and held meetings to confer on their joint intereſts. Such were thoſe of Delphi, Delos, Epheſus, Olympia, Eryx, &c. and perhaps that of Jupiter Nemæus, of which the remains, ſituated in the ancient territory of Argos, are here publiſhed. The firſt belonged to all Greece; and, by the fame of its oracle, collected contributions from all the neighbouring countries both of Europe and Aſia. The ſecond belonged to the Ionians; who in the earlieſt times held their general aſſemblies there, under the protection of the guardian deity Apollo, for the purpoſes of buſineſs, devotion, and pleaſure. All complaints and accuſations of one ſtate againſt another, were heard and ſettled by arbitrators; joint ſacrifices and votive preſents were offered to the gods; and feats of ſtrength, trials of ſkill, and efforts of genius, were diſplayed by the pugiliſts, the wreſtlers, and the poets.

OF THE ANCIENT GREEK AND ROMAN THEATRE.

ARISTOPHANES reflects on the Athenians for tumultuouſly crowding and puſhing each other to obtain a ſeat on the front rows or places neareſt to the orcheſtra, which in the Grecian theatre was the place for the chorus; and adjoining to this, ſomewhat elevated, the proſcenium, anſwering to our ſtage, on which in early times a platform was raiſed, where the reſponſes of the actors replying to the chorus were delivered. This part of the theatre was covered. Beyond the ſtage was the ſcene itſelf, richly decorated with ornaments of architecture, bas relievos, and painting. Near to the theatre were uſually porticoes, temples, and baſilicas. At Rome, for many ages, the theatres were temporary ſtructures of wood, raiſed at the expence of the ædiles, or other candidates for popular favour, and renewed as occaſion required. Even the permanent theatres of Pompey, Balbus, and Marcellus, ſeem to have been conſtructed for the exhibitions of the gladiators, rather than for the uſe of the ſtage. Suetonius, in the life of Auguſtus, relates, that, when the emperor aſſigned to each order its place, the women were allowed to ſee the games only from the upper portico; and that afterwards they were abſolutely prohibited from entering the theatre; it not being decent for them to aſſiſt at ſuch repreſentations. Theſe regulations were however ſoon laid aſide. Juvenal, in his ſixth ſatire, ſpeaks of the ardour with which the women in his time crowded to the gymnaſtic exerciſes.

Calphurnius

Calphurnius Siculus, in an eclogue which has been preferved entire, introduces a country-man, who for the firft time having been prefent at the games, on his return to Rome relates to a neighbour the wonderful fights with which he had been entertained. Many particulars worthy of notice, and explanatory of thefe ftructures, are to be met with in his poem.

In the amphitheatre of Vefpafian the entrances were diftinguifhed by numbers cut on the ftone over each arch. Of thefe arches, eighty in number, thirty ftill remain on the north fide with the figures entire, excepting on one arch only, where they are wanting. It has been fuppofed that this entrance was referved for the emperor and his fuite. At the dedication of the building by Titus, each order of the ftate had its fixed place. To the college of the Arvals, or priefts of Romulus, were certain feats appropriated, which are noticed in an infcription publifhed by Marangoni, in his defcription of this amphitheatre, which was already verging to a ftate of decay in the time of Theodoric; the ftones which had fallen being ufed as materials for repairing the walls of Rome.

CULTIVATION OF THE RUTA BAGA, OR SWEDISH TURNIP.

RUTA baga is a moft valuable vegetable, notwithftanding all that has been faid and written to the contrary. Hitherto the failure of the crop may be afcribed to the mode in which it has been attempted to be cultivated; having been, for the moft part, fown on a fmall plot of ground, and afterwards tranfplanted like cabbages. The abfurdity of this method is extremely obvious, as the time of removing the plants falls to be about the latter end of June, when there is commonly a fevere drought; they are long in taking root, and from the check they receive they feldom recover throughout the whole fummer. This is befides an expenfive mode of proceeding, and it is frequently altogether impracticable from fcarcity of hands. Thefe objections fuggefted the idea of fowing them in every refpect as is commonly done with the field-turnip, only a few days earlier; the refult for years has uniformly demonftrated the utility of this method. We always fow them about the firft of June, on drills twenty-feven inches apart, and allow them ultimately ten inches afunder in the drills.

We have often feen crops that might be faid to be entirely loft, upon fields admirably adapted to the growth of turnip, for no other reafon than too thin fowing. This appears to be not only a great, but alfo a general, error. It has been often faid, that one pound of feed is fufficient to fow an acre; but after repeated trials, and the faireft experiments. I have uniformly found, that three time this quantity is little enough. There cannot be a doubt, that, if all the feeds contained in one pound were to grow, there would be great abundance; but they are liable to fail from fo many caufes, that fo fmall a quantity can never be depended on; befides, the value per lb. is fuch a trifle, that it feems abfurd in the higheft degree to be fparing of it, when it can be the mean of fecuring fuch a valuable crop.

It may not be unneceffary here to obferve, that the fame machine that fows the common will not anfwer for fowing the Swedifh turnip; the reafon is, the feeds of the former being fmaller, require the apertures, or holes, to be lefs than that for fowing the latter. Hence, what

what would ſow the one too thick, would ſow the other too thin. To avoid the perplexity, therefore, attending the altering the machine to accommodate either of the ſeeds, we have two exactly ſimilar, except the width of the apertures.

So ſoon as the turnips begin to appear, they are always, more or leſs attacked by the fly;—a moſt deſtructive vermin! Many remedies have been recommended for deſtroying this inſect. Thick ſowing, however, ſeems to be as rational a one as any I have ever ſeen, and the only one I ever apply, together with rolling the ridges when the plants are five or ſix days above ground. This is but ſeldom performed, having never known an inſtance of it; but nevertheleſs is very neceſſary, as it not only diſplaces many of the inſects, but deſtroys others, and renders the ſurface perfectly ſmooth, which tends to keep out the drought, whereby the growth of the plants is greatly promoted.

The Swediſh turnip appears to poſſeſs three great advantages, to which the common ſeems to have no claim, viz. 1. They reſiſt the utmoſt ſeverity of the winter; 2. Are longer in running to ſeed; and, 3. The produce is more abundant.

They reſiſt the utmoſt ſeverity of the winter rains and froſt. A complete proof of this we had in winter 1795. Seven acres of turnip were all in one field, of which one, exactly in the centre, was Swediſh. The whole ſix acres of common, may be ſaid to have been totally deſtroyed by the froſt, while not one of the ruta haga was in the ſmalleſt degree damaged. A more ſubſtantial proof of their durability cannot reaſonably be expected.

They are longer in running to ſeed, in ſpring, than the common turnip, which may be conſidered a great advantage, as thereby the green food for cattle is continued till the graſs. I am writing this paper on the 16th of April 1798,—the graſs conſiderably advanced, and have ſtill on hand upwards of forty tons of the Swediſh turnip in high perfection.

Any given quantity of the Swediſh turnip, not only feeds better than the common, but their produce is alſo greater, upon a given quantity of ground. We have frequently from forty to fifty tons per acre, of the field turnip; but have ſeldom leſs than ſixty of the Swediſh, and in 1797 the whole crop was upwards of 72 tons.

It ſeems to be an opinion founded in error, that black cattle are not fond of this kind of turnip; and that the hardneſs of their texture is produced as a proof by thoſe who maintain this doctrine. That they are longer in eating as much as ſatisfies them, we allow; but that they are leſs fond of them ultimately, we never could diſcover.—Theſe obſervations equally apply to ſheep.

Whilſt we are anxiouſly endeavouring to excite attention to the more extenſive cultivation of this vegetable, by enumerating ſome of its advantages, we are not inclined to aſcribe virtues to it which by no means it is entitled to. To aſſert, as has been done, that this, or indeed any other of the ſame tribe, is as fit for the purpoſes of nutrition, after it has been exhauſted by running to ſeed, appears altogether incomprehenſible, and not warranted by experience.

BARNTON, *Sept.* 3, 1798.

CAUSES

CAUSES AND CURE OF BALDNESS.

THE word uſed by the learned for the falling off of the hair is *alopecia*, from ἀλώπηξ, *a fox*, becauſe a fox is ſubject to a diſtemper which reſembles it. It is called alſo *capillorum defluvium*, *athrix*, *depilis*, and *phalacrotis*; when particularly on the ſincipur, *calvitics* and *calvitium*; which Galen ſays is owing to a defect of moiſture. When the bald part is ſmooth and winding, like the track of a ſerpent, it is called *ophiaſis*; but the general name of all the different appearances of bald places is *area*, which name is taken from the area in a garden, a ſpot on which not any thing grows; though Blanchard ſays, that the hair falls off areatim, by ſhedding; whence, in general, this diſeaſe is called *area*.

Theſe diſorders ſeem to have been more common among the ancients than they are in our days. Celſus ſays, that the alopecia comes at any age, but the ophiaſis only affects infants; and Sennertus obſerves, that they both are common to all ages, though they are moſt frequently met with in childhood, and often ſucceed the tinea, achores, and favi. The cauſe is a faulty humour that deſtroys the roots of the hair, and that ſometimes only perverts the humour that nouriſhes them, in which caſe the hair turns white, yellow, &c. according to the different quality of the morbid humour. Galen ſays, that eating muſhrooms may cauſe that bad quality in the humours which produces theſe diſorders; and alſo that malignant and contagious diſeaſes of various kinds may produce the ſame effect.

The alopecia ſpreads itſelf on the beard, as well as on the hairy ſcalp, and is irregularly formed. The ophiaſis uſually begins at the back part of the head, and creeps about the breadth of two fingers, till it hath extended its two heads to both the ears, and ſometimes to the forehead, till both heads meet in one. The ophiaſis ſeems to be more malignant than the alopecia, ſince that in it not only the roots of the hair, but alſo the cuticle is corroded as far as the roots reach; the ſkin alſo changes its colour, and is ſometimes pale; at others, darker coloured; and, if pricked, a ſerous blood iſſues out. Theſe diſorders differ from the tinea: in the latter the excoriations and exulcerations are deeper, and often the hair does not grow again. In infants theſe diſorders commonly go off as age advances; but in adults, the cure, eſpecially of the ophias, is very difficult. If the part does not grow red by friction, a cure is vainly attempted; but, in proportion as a redneſs appears readily on rubbing the part, the cure may be expected to be eaſy and ſoon effected. If a leproſy is the cauſe, the caſe is incurable. The beſt prognoſtic is when hairs begin to puſh out on the edges of the areas.

As to the cure, if any other diſeaſe attends, begin by removing it; which done, it often falls out that the alopecia, &c. depending thereon, is removed alſo. Before the hair falls off, if ſigns of the approaching diſeaſe attend, gentle repellents and corroborants may be uſed; but if the diſeaſe is formed, repellents muſt be omitted; the head muſt be ſhaved, then waſhed with ley in which is infuſed the abrotanum and ſuch-like herbs, after which let the part be rubbed with a flannel or other coarſe cloth until the ſkin grows red; this done, applications of muſtard, white lily roots, nitre, tar, and aſhes of ſouthern-wood, may be directed; or, waſh the head every

 night

night at going to bed with a ley prepared by boiling the aſhes of vine-branches in red wine. A powder made by reducing hermodactyls to fine flour, is alſo recommended for the ſame purpoſe. In caſes where the baldneſs is total, a quantity of the fineſt burdock-roots are to be bruiſed in a marble mortar, and then boiled in white wine until there remains only as much as will cover them. This liquor, carefully ſtrained off, is ſaid to cure baldneſs, by waſhing the head every night with ſome of it warm. A ley made by boiling aſhes of vine-branches in common water is alſo recommended with this intention. A freſh-cut onion, rubbed on the part until it be red and itch, is likewiſe ſaid to cure baldneſs. A multitude of ſuch remedies are every where to be found in the works of Valeſcus de Taranta, Rondeletius, Hollerius, Trincavellius, Celſus, Senertay, and other practical phyſicians.

STRICTURES ON ALPHABETS.

THE word *alphabet* is derived to us from the French, who ſpell it juſt as we do; and comes from *alfabeto*, Ital. *alfhabêto*, Sp. of *alphabetum*, Lat. q. d. alpha, αλφα, beta, βετα, Gr. of אלף, Heb. he taught, whence אלוף, a leader or firſt of a company. The number of letters is different in the alphabets of different languages. The Engliſh alphabet contains 24 letters; to which if we add *j* and *v* conſonant, the ſum will be 26: the French contains 23; the Hebrew, Chaldee, Syriac, and Samaritan, 22 each; the Arabic, 28; the Perſian, 31; the Turkiſh, 33; the Georgian, 36; the Coptic, 32; the preſent Ruſſian, 41; the Greek, 24; the Latin, 22; the Sclavonic, 27; the Dutch, 26; the Spaniſh, 27; the Italian, 20; the Ethiopic and Tartarian, each 202; the Shanſcrit, 50; the Indians of Bengal, 21; the Barameſe, 19. The Chineſe have, properly ſpeaking, no alphabet, except we call their whole language by that name; their letters are words, or rather hieroglyphics, amounting to about 80,000. The Americans had no letters when that country was diſcovered by the Spaniards. The Acaanibas engrave a repreſentation of their memorable events and epochas on ſtones and metals; their ſongs ſupply the reſt. In Peru, and Chili, to keep an account of their goods and chattels, and to preſerve the memory of their particular affairs, the Indians have recourſe to certain knots of wool, which, by the variety of their colours and ties, ſerve inſtead of characters and writing. The knowledge of theſe knots, which they call *quipos*, is one of their great ſciences; but which is always kept as a ſecret, and never revealed to the children till the fathers think themſelves at the end of their days.

It has been a matter of conſiderable diſpute whether the method of expreſſing our ideas by *letters*, be really a human invention; or whether we ought to attribute an art ſo exceedingly uſeful to an immediate revelation from the Deity; an enquiry into which we ſhall not enter here. Alphabets were not contrived with deſign, according to the juſt rules of reaſon and analogy; but have been ſucceſſively framed, altered, &c. as occaſion offered. And hence many grievous complaints as to their deficiencies, and divers attempts to eſtabliſh new and more adequate ones in their places. Biſhop Wilkins charges all the alphabets extant with great irregularities, with reſpect both to the order, number, figure, power, &c. As to the order, it appears inartificial,

inartificial, precarious, and confused; because the vowels and consonants are not reduced into classes, with such orders of precedence and subsequence as their natures will bear. Even the Hebrew order is not free from this imperfection. As to number, they are both redundant and deficient. Redundant either by allotting several letters to the same power and sound, as in the Hebrew כ and ש, and the ordinary Latin *c* and *k*, *f* and *ph*; or by reckoning double letters among the simple elements of speech, as in the Hebrew צ, the Greek ξ and ψ, the Latin *q* (cu), *x* (cs), and the *j* consonant, or jod. Deficient in divers respects, especially in regard of vowels, of which there are seven or eight kinds commonly used, though the Latin alphabet only takes notice of five, whereof *i* and *u*, according to our English pronunciation, are not properly vowels, but dipthongs. Add to this, that the difference among vowels, in respect of long and short, is not sufficiently provided for. The ancients, we know, used to express a long vowel by doubling its character, as *amaabam*, *naata*, *ree*, *seedes*, *sanctissimiis*; though the vowel *i*, instead of being doubled, was frequently lengthened, as ÆDILIS, PISO, VIVUS. The ways used in English for lengthening the abbreviating vowels, viz. by adding *e* mute to the end of a syllable in order to prolong it, and doubling the following consonants for the shortening of a vowel, as *wane wann*, *ware warr*, &c. or else by inserting some other vowel for the lengthening of it, as *meat met*, *read red*, &c. are all improper, because the sign ought ever to be where the sound is. As to their powers, again, these are not always fixed to the same signification: the vowels, for instance, are generally acknowledged to have each of them several sounds. Thus the power of the vowel *e* is expressed in writing no less than six different ways, viz. by *e*, as in *he*, *me*, *she*; by *ee*, in *three*, *free*; by *ie*, in *field*, *yield*, *chief*; by *ea*, in *near*, *dear*, *hear*; by *eo*, in *people*; by *i*, in *privilege*. So is the power of the vowel *a*; as in *all*, *aul*, *aw*, *fault*, *caught*, which are only various ways of writing the same long vowel; besides the other distinct ways of expressing the same vowel when used short. The power of *o* is written five ways; *o*, as in *to*, *who*, *move*; *oe*, as in *doe*; *oo*, in *moon*, *noon*; *ou*, in *could*, *would*; *wo*, in *two*; and so of the rest. Nor are the consonants of more determinate powers; witness the different pronunciation of the same letter *c* in the same word *circo*, and of *g* in *negligence*. To say no more, the letters *c*, *s*, and *t*, are used alike to denote the same power; and the letter *s* is commonly used for *z*; and, which is yet worse, some letters of the same name and shape are used at one time for vowels, and at another for consonants, as *j*, *v*, *w*, *y*. From this confusion in the power of letters there arise divers irregularities; as, that some words are distinguished in writing which are the same in pronunciation, as *cessio* and *sessio*, &c. and others are distinguished in pronunciation which are the same in writing. Hence also the Latin *malè* is a dissyllable, and the English *male* a monosyllable. The names also in most alphabets are very improperly expressed by words of divers syllables, *alpha*, *beta*, &c. in which respect the Roman and English alphabets, which only name the letters by their powers, have greatly the advantage over the rest. Lastly, their figures are not well concerted; there being nothing in the characters of the vowels answerable to the different degrees of apertion; nor in the consonants analogous to the agreements or disagreements thereof.

The

The learned author of Hermes informs us, that to about twenty plain elementary ſounds we owe that variety of articulate voices which have been ſufficient to explain the ſentiments of ſuch an innumerable multitude, as all the paſt and preſent generations of men. Mr. Sheridan ſays, that the number of ſimple ſounds in our tongue are twenty-eight; while Dr. Kenrick inſiſts, that we have only eleven diſtinct ſpecies of articulate ſounds, which even by contraction, prolongation, and compoſition, are increaſed only to the number of ſixteen; every ſyllable or articulate ſound in our language being one of the number. Biſhop Wilkins and Dr. William Holder ſpeak of thirty-three diſtinct ſounds.

After the decompoſition of language into the elementary ſounds, the next ſtep towards the notation of it by alphabetical characters, would be the delineation of a ſeparate mark or letter to repreſent each ſound; which marks, though few in number, would admit of ſuch a variety of arrangements and combinations, as might be capable of producing that infinity of articulate ſounds which compoſe language. The ingenious Wachter, in his Natura et Scriptura Concordia, p. 64, endeavours to ſhew, that ten marks or characters are ſufficient for this purpoſe. His ſcheme is as follows:

Genus.	*Figura.*	*Poteſtas.*
Vocal	O	a. e. i. o. u.
Guttural	O |	k. e. ch. q. g. h.
Lingual	∠	l.
Lingual	Γ	d. t.
Lingual	—⊃	r.
Dental	⊓	f.
Labial	3	b. p.
Labial	m	m.
Labial	⊏	s. ph. v. w.
Naſal	Λ	n.

If this be the caſe, then the moſt ſimple alphabet, which conſiſted only of thirteen letters, muſt have been abundantly ſufficient to anſwer all the purpoſes of mankind, and much of our twenty-four letter alphabet may appear ſuperfluous. That able mathematician Tacquet has calculated the various combinations of the twenty-four letters, even without any repetition, to amount to no fewer than 620,448,401,733,239,439,360,000; while Clavius makes them only 5,852,616,738,497,664,000. Either of theſe numbers, however, is

infinite to the human conceptions, and much more than ſufficient to expreſs all the ſounds that ever were articulated by man. As there are more ſounds in ſome languages than in others, it follows of courſe, that the number of elementary characters or letters muſt vary in the alphabets of different languages. The following is the ſcheme of the Engliſh alphabet, as given by Mr. Sheridan in his Rhetorical Grammar, p. 9.

Number of ſimple ſounds in our tongue, 28.

3	1	2	3	2	3	1	1	1		
a	a	a	e	o	o	e	i	u	w	y
hall	hat	hate	beer	note	nooſe	bet	fit	but	ſhort oo	ſhort ee

19 *Conſonants,* { eb ed ef eg ek el em en ep er es et ev ez eth̄ eth eſh ezh ing

2 *Superfluous,* *c,* which has the power of *ck,* or *eſs* ;
q, that of *ek* before *u.*

2 *Compound,* *j,* which ſtands for *edzh* ; *x,* for *ks* or *gz.*

1 *No letter,* *h,* merely a mark of aſpiration.

Conſonants divided into Mutes and Semivowels.

6 *Mutes* eb ed eg ek ep et.
3 *Pure Mutes,* ek ep et. 3 *Impure,* eb ed eg.

13 *Semivowels, or Liquids.* ef el em en er eſs ev ez eth̄ eth eſh ezh ing.

9 *Vocal,* el em en er ev ez eth ezh ing.

4 *Aſpirated,* ef eſs eth̄ eſh.

Divided again into

4 *Labial,* eb ep ev ef.
Dental, ed et eth eth̄ ez eſs ezh eſh.
4 *Palatine,* eg ek el er.
3 *Naſal,* em en ing

Mr. Sheridan obſerves, that our alphabet is ill calculated for the notation of the Engliſh tongue, as there are many ſounds for which we have no letters or marks: and there ought to be nine more characters or letters to make a complete alphabet, in which every ſimple ſound ought to have a mark peculiar to itſelf. The reaſon of the deficiency is, that the Roman alphabet was formerly adopted for the notation of the Engliſh language, though by no means ſuited to the purpoſe.

Many authors are of opinion, that letters derive their forms from the poſitions of the organs of ſpeech in their pronunciation. Van Helmont has taken great pains to prove, that the Chaldaic characters are the genuine alphabet of nature; becauſe, according to him, no letter can be rightly ſounded without diſpoſing the organs of ſpeech into an uniform poſition with the figure of each letter; and, in ſupport of this ſyſtem, he has anatomiſed the organs of articulation.

The learned Biſhop Warburton, however, aſcribes the origin of alphabetical writing to hieroglyphics, or to a ſeries of objects or figures ſo delineated as to repreſent the ideas of the human mind. And that, when philoſophy advanced, and learned men wrote, the exact delineation of hieroglyphic figures becoming too tedious and too voluminous, they then, by degrees, perfected another character, which he calls the cunning hand of hierogyphics; theſe, being at firſt formed only by the outlines of each figure, became at length a kind of marks, which led to the conſtruction of letters, and conſequently to the formation of an alphabet.

Mr.

Mr. Nelme, on the contrary, has endeavoured to ſhew that all elementary characters or letters derive their from form the line and the circle. His alphabet conſiſts of thirteen radical letters, four diminiſhed, and four augmented. The radicals are L, O, S, A, B, C, D, N, U, I, E, M, R. H, according to him, is derived from A; P from B; T from D; and F from U; theſe are called diminiſhed letters. The augmented ones are, Z from S; G from C; W from U; and Y from I. He proves that his characters are very ſimilar to thoſe of the ancient Etruſcans: but all characters are compoſed either of lines and circles of the former, and of parts of the latter. Mr. Gebelin again, deduces them from hieroglyphic repreſentations; and has given ſeveral delineations of human figures, trees, &c. in confirmation of this hypotheſis.

One of the moſt ſimple alphabets has been formed by making two perpendicular and two horizontal lines:

Thus,

a	b	c
d	e	f
g	h	i

From which may be deduced nine different characters or letters. Thus,

Nine more may be made by adding a point to each, and as many more as

k	l	m
n	o	p
q	r	s

may be ſufficient for the notation of any language, by adding two or more points to each character.— Though theſe ſquare characters are not calculated for diſpatch; yet they may be made as expeditiouſly, or more ſo, than the Tartar, the Bramin, the Caſhmirian, or many others. Writing compoſed of theſe characters, is at firſt ſight ſomewhat like the Hebrew. Mr. Dow, author of the Hiſtory of Hindooſtan, lately formed a new language and alphabet. This language, and the characters formed for its notation, were ſo eaſy, that a female of his acquaintance acquired the knowledge of them in three weeks, and correſponded with him therein during their intimacy.

YEAST, a REMEDY in PUTRID DISEASES.

IN this philoſophic age, when diſeaſes ſo often change their appearance from what phyſicians had any former experience of, it is a pleaſing reflection that the ſtudy of medicine has of late been ſo much ſimplified, and almoſt every diſtemper incident to the human body ſo fully explained, as to come within the common apprehenſion of mankind. The following facts, communicated to the world by a worthy clergyman, afford an antidote for the moſt dangerous diſeaſe with which the human body can be afflicted: ſo that it is hoped one of the moſt crowed avenues to the grave is at length in a great meaſure cloſed.

Seventeen years ago I went (ſays he) to reſide at Brampton, a populous village near Cheſterfield. I had not been there many months before

before a putrid fever broke out among us. Finding by far the greater number of my pariſhioners too poor to afford themſelves medical aſſiſtance, I undertook, by the help of ſuch books on the ſubject of medicine as were in my poſſeſſion, to preſcribe for them. I early attended a boy about fourteen years of age, who was attacked by the fever. He had not been ill many days before the ſymptoms were unequivocally putrid. I then adminiſtered bark, wine, and ſuch other remedies as my books directed. My exertions were however of no avail; his diſorder grew every day more untractable and malignant, ſo that I was in hourly expectation of his diſſolution. Being under the neceſſity of taking a journey, before I ſet off I went to ſee him, as I thought, for the laſt time, and I prepared his parents for the event of his death, which I conſidered as inevitable, and reconciled them in the beſt manner I was able, to a loſs which I knew they would feel ſeverely. While I was in converſation on this diſtreſſing ſubject with his mother, I obſerved, in a ſmall corner of the room, a tub of wort working. The ſight brought to my recollection an experiment I had ſomewhere met with, "of a piece of putrid meat being made ſweet by being ſuſpended over a tub of wort in the act of fermentation."—The idea flaſhed into my mind, that the yeaſt might correct the putrid nature of this diſeaſe, and I inſtantly gave him two large ſpoonfuls. I then told the mother, if ſhe found her ſon better, to repeat this doſe every three hours. I then ſet out for my journey; upon my return, after a few days, I anxiouſly enquired after the boy, and was informed he was recovered. I could not repreſs my curioſity, though I was greatly fatigued with my journey, and night was come on; I went directly to where he lived, which was three miles off, in a wild part of the moors. The boy himſelf opened the door, looked ſurpriſingly well, and told me he felt better from the inſtant he took the yeaſt.

After I left Brampton, I lived in Leiceſterſhire. My pariſhioners being there few and opulent, I dropped the medical character entirely, and would not preſcribe for my own family. One of my domeſtics falling ill, accordingly the apothecary was ſent for. His complaint was a violent fever, which in its progreſs became putrid. Having great reliance, and deſervedly, on the apothecary's penetration and judgment, the man was left ſolely to his management. His diſorder, however, kept daily gaining ground, till at length the apothecary conſidered him in very great danger. At laſt, finding every effort to be of ſervice to him baffled, he told me he conſidered it to be a loſt caſe, and that in his opinion the man could not ſurvive twenty-four hours. On the apothecary thus giving him up, I determined to try the effects of yeaſt. I gave him two large ſpoonfuls, and in fifteen minutes from taking the yeaſt, his pulſe, though ſtill feeble, began to get compoſed and full. He, in thirty-two minutes from his taking it, was able to get up from his bed and walk in his room. At the expiration of the ſecond hour, I gave him a baſon of ſago, with a good deal of lemon, wine, and ginger in it; he ate it with an appetite; in another hour I repeated the yeaſt; an hour afterwards I gave the bark as before; at the next hour he had food; next had another doſe of yeaſt, and then went to bed; it was nine o'clock; he told me he had a good night, and was recovered. I

however repeated the medicine, and he was soon able to go about his business as usual.

About a year after this, as I was riding past a detached farm-house, at the outskirts of the village, I observed a farmer's daughter standing at the door, apparently in great affliction. On enquiring into the cause of her distress, she told me her father was dying: I dismounted, and went into the house to see him; I found him in the last stage of a putrid fever. His tongue was black, his pulse was scarcely perceptible, and he lay stretched out like a corpse, in a state of drowsy insensibility. I immediately procured some yeast, which I diluted with water, and poured down his throat; I then left him with little hopes of recovery; I returned, however, in about two hours, and found him sensible and able to converse; I then gave him a dose of bark; he afterwards took at a proper interval some refreshment. I staid with him till he repeated the yeast, and then left him, with directions how to proceed; I called upon him the next morning at nine o'clock; I found him apparently well, and walking in his garden. He was an old man upwards of seventy.

I have since administered the yeast to above fifty persons labouring under putrid fevers; and what is singular (continues this benevolent man), I have not lost a patient.

The above has been handed to us by a gentleman in Edinburgh, who lost two children by the fever which has been so prevalent and so fatal of late.—He had a third child who was taken ill; and, this prescription having come to his knowledge, he made the experiment, which was happily crowned with success.

PRESENT STATE OF ITALY.

AT the moment that Italy is about to be convulsed by the renewal of hostilities, on the termination of which depends the deliverance of eighteen millions of people, or their confirmed submission to the imperious dictates of the cruel tyranny, it cannot be uninteresting to take a short review of the situation to which the different parts of that country are at present reduced.

Every one is aware of the oppressive means, the perfidious conduct, and the base intrigues, adopted by the French directory to revolutionize Piedmont. One fact, not sufficiently known, remains yet to be added to the black catalogue of crimes, which consigns to everlasting infamy the name of French republicanism. When his Sardinian majesty received information of the surprise of his fortresses of Navarra, Alexandria, and Suza, and that the avenues to Turin were in possession of the French, he issued a proclamation, stating his punctual observance of every article of the treaties concluded between him and the republic, declaring his determination to maintain the interests of his people and crown, and assuring his faithful subjects, that he had in no instance given occasion to the measures which had recently taken place. The proclamation, though mild and moderate, immediately excited the apprehensions of the chief agents of France, and was considered by them as sufficiently strong to induce the Piedmontese to take arms against the enemy. Joubert and his adjutant Cloubel, fearful of the result of the proclamation, immediately compelled the king, with the dagger and firebrand of intimidation in their hands, to retract and suppress it. They threatened

tened to bombard and ſet fire to Turin; and the unfortunate monarch was forced, from the love of his ſubjects, to ſign the act of his own degradation and their ſlavery.—Piedmont cannot be kept in a ſtate of tranquillity by its new maſters, and the moment in which hoſtilities ſhall be renewed in Italy, they will find it neceſſary to employ an army of 30,000 men to retain the inhabitants in ſubjection. The infamous pretence of communicating the engagement of liberty to the people, can have but little effect on the minds of men who have ſuffered ſo much from the perſecutions and oppreſſions of their *deliverers*, and the ſmall number and contemptible character of the native revolutioniſts prevent them from poſſeſſing any influence over the nation.

The republic of Genoa, exhauſted by plunder, forced loans, and contributions, and convulſed by the anarchy of its own government, and by the military and fiſcal deſpotiſm of the directory, will not ſuffer any favourable opportunity to paſs which may afford a chance of reſtoring its ancient conſtitution. The Genoeſe, however, do not wiſh merely to change one oppreſſion for another; and it cannot be ſuppoſed that they will intereſt themſelves for the ſucceſs of the Auſtrians, in whoſe deſigns they can have no confidence, and on whoſe cordial aſſiſtance they can place no juſt reliance.

The inhabitants of Lombardy are of a very different character from the Piedmonteſe and Genoeſe, and no ſpirited exertions againſt the French can be looked to from them. The treaty of Campo Formio has extinguiſhed every hope in that quarter, and the ſyſtem of French *morality* and irreligion has made ſo many proſelytes, as to ſuppreſs every hope of a vigorous co-operation with the Imperial forces.—The people of the territories of Bologna and Romagna, are animated by oppoſite ſentiments to thoſe of their neighbours the Lombards. They are decidedly averſe to the uſurpations of the directory, and are only kept in ſubjection by a conſiderable body of troops.

The fall of Tuſcany has, very probably, already been, or ſoon will be, decided; and in that caſe the French, after plundering that beautiful and happy country of all the riches which have been the fruits of a wiſe government for forty years paſt, will find it neceſſary to maintain a ſtrong army in order to reconcile the inhabitants to the bleſſings of the fraternity which they have been forced to accept. In this part of Italy, appearances in general are not very favourable to the republicans. On the frontier of Tuſcany, and from the center of the Appenines, as far as Civita Vecchia, an obſtinate inſurrection was ſtill in a formidable ſtate at the end of February. The inſurgents had cut off all communication between the enemy and Rome, while Civita Vecchia was preparing to undergo a regular ſiege. At the other extremity of the line, on the Adriatic Gulph, the March of Ancona was involved in continual tumults; while the whole interior of the Eccleſiaſtical State preſents but one ſcene of aſſaſſination, ruin, famine, the moſt horrible tyranny, avarice, revenge, and deſpair. Every kind of buſineſs, induſtry, and ſocial habit, is at an end, while the revolutionary banditti who ravaged the country and plunged it into miſery, begin to feel the effects of the penury and diſtreſs which has been produced by their crimes.

The kingdom of Naples is on the point of being precipitated into into an abyſs equally dreadful in horror and wretchedneſs. The capture

capture of Naples, which was attended with circumftances fo fhocking to humanity, has been followed by a fyftem of rapine and devaftation in which the French generals, commiffioners, comptrollers, receivers, contractors, &c. rival each other in infamy. The new republic may now be juftly termed *Vefuvian*, and the wreaths of Neapolitan liberty are compofed of the torches and cannon of Championnet. The domiciliary vifit made by the French troops at Naples, on the 7th February, furnifhes a fufficient criterion to enable the public to form a juft opinion of the eagernefs of the people to be revolutionized, and of their future exertions in fupport of their deliverers.

The emperor has certainly much to hope from the difaffection manifefted by the mafs of the people of Italy to the meafures and views of the directory; but the French poffefs great advantages over him by the fuperiority of their military pofitions, and the number of their troops is equal to that of the Auftrians. It is only left for his Imperial majefty to re-eftablifh the influence which he once poffeffed over the public mind, and which has been fo confiderably impaired by his defeats, and ftill more by his treaties. The appointment of General Suwarrow to the chief command in Italy may prove highly beneficial to the common caufe, and the reinforcements which he brings to the emperor's armies muft be truly formidable to France. But it is the opinion of fome of the moft experienced men in military affairs in Germany, that it would have been wifer not to have blended together the Auftrian and Ruffian armies. They are fo effentially different in a variety of confiderations, that they cannot be well united without making the fpirit and proceedings of the one entirely fubordinate to thofe of the other; and the inconveniencies which muft arife from fuch fubordination are too evident to require any comment.

APRIL, 1799.

TRAVELS OF CITIZEN B. FAUJAS SAINT-FOND.

M. FAUJAS SAINT-FOND, who travelled through a confiderable part of England and Scotland feveral years ago, has lately publifhed an account of his tour at Paris. The character of the author and his former writings are too well known to the learned naturalifts of this and every country of Europe to require any comment on our part; and whatever expectation, from this journey, his merited reputation may have raifed, will, we are convinced, be amply gratified by the perufal of the work before us.

This tour was undertaken by M. Faujas, for the purpofe of examining the ftate of the fciences, the arts, natural hiftory, and manners, in Great Britain; and it muft be confeffed that it would be difficult to find a writer whofe knowledge or whofe candour would have been better adapted to the execution of fo important a tafk. His obfervations on our manufactures, particularly thofe which depend upon chemical or mechanical proceffes, and the manner in which he contrafts them with thofe of his own country, afford much ufeful information refpecting the comparative fituation of the commercial arts in France and in England, and deferve to be ftudied with attention by all who wifh well to thofe improvements that fupply the wants, or add to the enjoyments, of human life.

A confiderable portion of thefe volumes is occupied with an ac-

count of the geology and lithology of the places which the author vifited, among which we would chiefly recommend to the notice of the learned reader, his defcription of the mountains of Derbyfhire—of the country round Newcaftle, Edinburgh, Glafgow, Perth, and St. Andrew's—of Inverary, Dalmaly, Oban, and other parts of Argylfhire—and of the celebrated Cave of Fingal, in the Ifland of Staffa. This is a fubject which is but imperfectly treated by the great Britifh traveller, Mr. Pennant, whofe Tour, in other refpects, contains fo much ufeful and important information; and, as M. Faujas often goes over the fame ground which was before trod by the illuftrious defcriber of the antiquity and the manners of Caledonia, his work forms not only a valuable, but a neceffary, companion to that of his learned predeceffor.

We are happy in this opportunity of announcing a publication which is calculated to promote the ftudy of Britifh mineralogy, which has unfortunately been too much neglected amongft us. We know little of the ftructure of our own country, and are chiefly indebted to foreigners for pointing out the rich field of obfervation it prefents; while we often pant for mere hear-fay accounts of diftant curiofities, we never think the real wonders that nature has placed within the reach of our perfonal obfervation.

Indeed natural hiftory, in all its branches, is fo interefting, and affords fo many fources of innocent pleafure, and ufeful inftruction, that its ftudy can never be too earneftly recommended. He who has devoted fome of his leifure hours to the fcience of nature, has fecured to himfelf a *property*, of which no change of fortune is likely to deprive him—that property exifts in the enjoyment which every object that furrounds him affords; not a blade of grafs that fprings under his foot, not a leaf that waves in the foreft, not an infect that crawls on the ground, not a pebble that lies on the fhore, but is to him an interefting fubject of delight and meditation.

But to return to our author. He has not confined himfelf to the fciences only. His obfervations on life and manners are very entertaining, and form an agreeable relief to the feverer parts of the work, though he may, perhaps with fome juftice, be accufed of occafionally defcending to too great a degree of minutenefs, particularly in what relates to the cuftoms of the Englifh table. His remarks, however, are almoft always pleafing from their novelty, and they are frequently profound, even when they arife out of the moft trivial fubjects.

The fcene of the commencement of this inftructing tour is London, where the author's intercourfe with Sir Jofeph Banks, Doctors Whitehurft, Cavallo, Lettfom, Sheldon, and other diftinguifhed men of letters, gives rife to very important obfervations, and renders this one of the moft interefting parts of the work. He flightly notices Mr. Arthur Young's comparifon of the population of London and Paris, which he confiders as erroneous; but it is not on fubjects of this kind that he chufes to dwell; natural hiftory, the fciences, the arts, and objects of commercial economy, principally engage his attention.

Among fome curiofities of natural hiftory, with which Sir Jofeph Banks prefented M. Faujas, was a fmall quantity of Chinefe hemp-feed. The exportation of this feed is very feverely prohibited in China; but a pound of it had reached London, concealed in a box, addreffed

addreſſed to the Preſident of the Royal Society. Sir Joſeph Banks divided two ounces of this valuable ſeed between Brouſſonet, who was alſo then in London, and the author, in order that they might make a trial of it in France, particularly in the ſouthern departments, where both of them had eſtates. The cultivation of the Chineſe hemp has, we believe, failed in England; but we learn from M. Faujas that is has perfectly ſucceeded in ſeveral parts of France, where it produces execellent ſeed. It is found to be of very great importance to avoid ſowing it near the common hemp. "I wait for peace," ſays our author, "to repay my obligation to the Engliſh; for it is no more than juſt to return that which they have ſo generouſly lent us."

M. St. Fond regrets that he had not the good fortune of ſeeing that celebrated anatomiſt Dr. Hunter, who was then in the country; but he viſited ſome other diſtinguiſhed profeſſors of that art. In mentioning Mr. Sheldon, he gives the following account of a very ſingular preparation of a human body in his poſſeſſion, which, though perhaps ſtill in this city, is, we imagine, very little known. The deſcription cannot fail to prove intereſting to a number of our readers.

"The anatomical cabinet of Sheldon contains a great variety of curious preparations. I dedicated ſeveral mornings to viſiting it, and examining a great number of valuable deſigns made by able artiſts; but nothing in this collection intereſted me ſo much as a kind of mummy, which was very remarkable in two reſpects: firſt, on account of the ſubject itſelf, of which I ſhall ſoon ſpeak; ſecondly, with relation to the manner of the preparation, and the particular care with which it had been made. It occupied a diſtinguiſhed place in the chamber where this anatomiſt uſually ſlept; and he was particularly fond of this work.

"I was introduced into a very handſome bed-room; a mahogany table, of an oblong form, ſtood in the midſt of it, facing the bed. The top of the table opened by a groove; and under a glaſs frame I ſaw the body of a young woman, of nineteen or twenty, entirely naked. She had fine brown hair, and lay extended as on a bed. The glaſs was lifted up, and Sheldon made me admire the flexibility of the arms, a kind of elaſticity in the boſom, and even in the cheeks, and the perfect preſervation of the other parts of the body. Even the ſkin partly retained its colour, though expoſed to the air. It appeared to me, however, that the fleſhy parts were rather dry, and that there was too great a tenſeneſs of the muſcles. This gave to the figure, though it ſtill poſſeſſed the remains of beauty, a meagre and feeble air, which conſiderably diminiſhed the delicacy of its traits. Sheldon informed me that this was partly occaſioned by the long ſickneſs of which the young woman died.

"He explained to me the manner in which this preparation had been made. He injected ſeveral parts of the body with ſtrong ſpirits of wine, ſaturated with camphire, and mixed with a ſmall quantity of turpentine. The ſkin was prepared and tanned, as it were, with finely powdered alum, rubbed on with the hand. The inteſtines were taken out, and covered with a varniſh, compoſed of a mixture of camphire and the common roſin. The ſame thing was done to all the internal parts of the body, which were afterwards paſſed over with alum. Sheldon aſſured me, that pulverized camphire, mixed with roſin, formed an excellent compoſition for preſerving

the flesh, and other soft parts. After having placed all the viscera thus prepared in the body, he then injected the crural artery with a strong solution of camphire, in rectified spirit. Wishing afterwards to imitate the natural tint of the skin of the face, a coloured injection was pushed through the carotides, to produce that effect. In this state of things, the body was placed on the table of which I have spoken; but within a double case of timber. The first is made of Virginia cedar, *(Juniperus Virginia.)* The inner bottom was covered with calcined chalk, to the thickness of one inch, in order to absorb all humidity. Upon this bed the body was extended. The box or case was then carefully shut up, to secure the body from the impression of the external air. The box was not opened until five years after the preparation was made. It was then observed to be in the same state of preservation in which it was first inclosed. No mark of decay appeared, and no insect had introduced itself near the body. The box had been several times opened when I saw it; and, though this mummy at that time still possessed elasticity in several parts, it is supposed that the action of the air will at last completely wither it.—A sentiment of curiosity made me ask Sheldon, at the moment he was closing up the table, who this young woman was, whose remains he had preserved with so much care. He replied frankly, and without any hesitation, 'It is a mistress whom I tenderly loved: I paid every attention to her during a long sickness; and, a short time before her death, she requested that I would make a mummy of her body, and keep her beside me: I have kept my word to her.'

The author visited Newcastle on his way to Scotland; and his remarks on the coal-mines, and the manufactures of that town, form one of the most instructive parts of the work. Arrived in Scotland, he presents through the whole of his route a correct picture of the geological structure of the country, investigates its antiquities, describes the manners and customs of its inhabitants, and intermixes the whole with curious anecdotes. The poems of Ossian and the ancient Caledonian music engaged his attention: he informs us, that Dr. Adam Smith took him to the annual competition for a prize given at Edinburgh, by the Highland Society, to the best player on the bagpipe; and he gives a very curious account of the impression which this singular exhibition made upon him. He speaks very respectfully of this celebrated author of the Wealth of Nations:— "That venerable philosopher, Dr. Adam Smith, was one of those whom I visited most frequently: he received me on every occasion in the kindest manner, and studied to procure for me every information and amusement that Edinburgh could afford. He had travelled in France, and resided for some time in Paris: his collection of books was numerous and excellently chosen; and the best French authors occupied a distinguished place in his library, for he was very fond of our language. In conversation with me, he spoke thus of Voltaire: He sought to correct the vices and follies of mankind by laughing at them, and sometimes by treating them with severity. Reason owes him incalculable obligations: the ridicule and the sarcasms which he so plentifully bestowed upon fanatics and hypocrites of all sects, have enabled the understandings of men to bear the light of truth, and prepared them for those enquiries to which every intelligent mind ought to aspire. He has done much more for the benefit of

mankind than thofe grave philofophers whofe books are read by a few only: the writings of Voltaire are made for all, and read by all. —On another occafion he faid, I cannot pardon the Emperor Jofeph II. who pretended to travel as a philofopher, for paffing Ferney without paying homage to the hiftorian of the Czar Peter I. from this I concluded that Jofeph was a man but of an inferior mind."

The following interefting extract relative to pearls, contains fome important facts in natural hiftory which we believe are little known.

" The mafter of the inn, who obligingly exerted himfelf refpecting every thing that could gratify my curiofity, brought me two fifhermen whofe particular employment was fearching for pearls. They conducted us to the river, which runs in a very pure ftream upon a bottom of fand or pebbles; and they foon brought up feveral dozens of fhells, from three and a half to four inches long, and a little more than two broad; their exterior colour was a deep brown, inclining a little to green; the upper fhell was thick, and of a fine mother-of-pearl colour within. flightly tinged with rofe-colour. I regarded this fpecies as belonging to the *mia pictorum* of Linnæus, or at leaft as very nearly refembling it. The fifhermen, in confequence of a handfome reward which we promifed them, engaged to open thefe fhells in our prefence upon the bank; but they ftipulated for the refervation of the pearls, if any fhould be found, that they might fell them to us at a feparate price: and to this propofition we acceded.

" Imagining from this that we fhould put a higher value on thofe pearls which might be found while we were prefent, thefe artful practitioners brought fome with them, which they dexteroufly introduced into feveral of the fhells in opening them: they appeared to be well exercifed in this petty fort of impofition, which however I detected in a manner that aftonifhed and perplexed them, and which deferves to be mentioned, as it depended upon a memorable fact refpecting one of the caufes which contribute to the formation of pearl.

" I defired them to open the mufcles before my fellow-travellers, whilft I went to amufe myfelf with fifhing fome of them; but they were to inform me when they difcovered any pearls. I was foon called, and fhewn a very fine pearl, perfectly round, and of a good colour: I looked at the fhell and the pearl, and then told them that the pearl was not found in the mufcle fhewn to me. The fifhers affured me that it was, and appealed to the teftimony of my companions, who confirmed their affertion: I affured my friends, however, that they were deceived, and begged them to watch the fifhers more narrowly the next time. I retired a few fteps, and in a minute or two I heard one exclaim, ' We have found another.' I went up; and, on examining the mufcle, pronounced that the pearl had for that time alfo been flipped into the fhell. The pearl was beautiful; but the price they demanded for it was fix times its value.

" The fifhers exhibited the utmoft aftonifhment; for, as I was at fome diftance from them, it was clear I could not have obferved their motions: my fellow-travellers, who attentively watched them, were themfelves deceived, or at moft entertained only a vague fufpicion; fo well fkilled were thefe men in an art which procured them a few additional fhillings from travellers.

" My art was fo fupernatural in their eftimation, that they confeffed the impofition, and frankly fhewed us fome other pearls which they had in referve for the fame purpofe. They were very anxious

to

to learn my ſecret, which would ſave them the pains of frequently opening a vaſt number of ſhells to no purpoſe, for they ſeldom found above one or two pearls in a week. But, as they knew no other language than the Earſe, and not even ſo much as a word of Engliſh, I could explain myſelf only by ſigns and geſtures; and, though my inſtructions were not very difficult, I doubt whether they were completely intelligible in a converſation of this ſort.

"My ſecret conſiſted merely in examining attentively the outſide of the muſcles, and when neither of the parts had any cavity or perforation, but preſented a ſurface ſmooth and free from calloſities, I could pronounce, without any apprehenſion of being deceived, that there was no pearl in ſuch a ſhell. If, on the contrary, the ſhell was pierced with auger-worms, and indented by other worms of the ſame kind, there were always found pearls more or leſs valuable, or, at leaſt, the embryos of pearls.

"This obſervation, which I have found invariably true hitherto, was the reſult of ſome enquiries, in which I had been engaged a long time before, reſpecting the formation of that beautiful animal product. Buffon introduces the information, which I communicated to him upon this ſubject, in his article upon pearls, p. 125, vol. iv. of the 'Natural Hiſtory of Minerals.' At that time I diſcovered that the pearl-fiſh is attacked by two claſſes of enemies. One is a very ſmall auger-worm, which penetrates into the inſide, near the edge of the valve, by working a longitudinal paſſage between the different laminæ that compoſe the cover. This ſmall channel, on extending to an inch or an inch and an half in length, doubles back in a line parallel to the firſt, and is ſeparated from it by a very thin partition of ſhelly matter. Theſe two parallel lines diſcover the direction of the worm in entering and returning, which is alſo diſtinguiſhable on the ſurface by two ſmall holes, cloſe to the edge, and in general near the mouth of the ſhell. The paralleliſm of the two paſſages may be demonſtrated by introducing a pin into each orifice. At the inner extremity, however, there is a ſmall circular portion, formed by the worm in turning round. As theſe ſmall channels or covert-ways are excavated in the part neareſt the mother-of-pearl, or ſilvery internal coat, the pearly juice ſoon extravaſates, and produces protuberances in that direction. The cylindrical bodies thus formed may be conſidered as elongated pearls, adhering to the internal lining of the ſhell. When ſeveral worms of this kind penetrate near each other, and unite their labours, the reſult is a ſort of pearly wen, with irregular protuberances, in which the iſſues of the paſſages which they have formed are eaſily diſtinguiſhable.

Another ſea-worm, much larger, and of the family of the multivalvous ſhell-fiſh, attacks the pearl-ſhells in a much more ingenious manner. This worm is a pholas of the ſpecies of ſea-dates. I have in my cabinet an oiſter from the coaſt of Guinea pierced by one of theſe pholades, which are ſtill as they were found in the heel of the oiſter. The ſhells of theſe ſingular pholades are hinged in the form of a crooked bill: the ſmall holes which they bore are in the figure of a pear; and pearls of this ſhape are ſometimes found, which were in high eſtimation among the ancients, and are at preſent very valuable in the Eaſt Indies.—There are undoubtedly ſeveral other kinds of worms which pierce the ſhell, and form cavities more or leſs round, in which the juice conſolidates into pearls.

"It

" It is this obfervation, which has no doubt been made by others befides me, that probably firft fuggefted to fome perfons concerned in the pearl-fifhery, the trick of making artificial perforations in the fhells, and thus forcing them to produce pearls. At London I faw fome fhells brought from China, which muft have undergone this operation : for the artificial hole was filled up with a piece of brafs wire, rivetted on the outfide of the fhell like the head of a nail, and the part of the wire which pierced the interior fhining coat was covered with a well-fhaped pearl, which feemed as if foldered to its extremity. It is probable that, with the Chinefe, who have been fo long fkilled in the arts, and whofe aftonifhing and multiplied induftry teaches us that we are but a comparatively new people, this is not a difcovery of a very modern date.

" Brouffonet, with whom I had a converfation upon this fubject in London, at the houfe of Sir Jofeph Banks, told me that a perfon had affured him, that there is ftill another method of obtaining pearls. The fhell, on which the experiment is to be made, muft be opened with the greateft care, in order to prevent the animal from being injured. A fmall portion of the inner furface is then fcraped off, and in its room is inferted a fpherical piece of mother-of-pearl about the fize of a very fmall grain of lead-fhot. This globule ferves as a nucleus to the pearly juice, which concretes around it, and, at a certain diftance of time, produces a fine pearl. He faid, that experiments of this nature had been tried in Finland, and repeated alfo in other countries.

" From thefe obfervations, it may be inferred that the production of pearls depends, perhaps, much more upon an external and accidental caufe than upon a natural fuperabundance or extravafation of the juice of which they are formed.

" There are very excellent pearls found in the river fhells of Loch Tay, if we may judge from fome which the fifhers of Killin offered to fell us at more than double the price of thofe which are in current fale. But thefe fine pearls are far from numerous ; on the contrary, a very great number are found which the jewellers reject, but which, though they may be not well calculated to form decorations for the ladies, are yet very interefting for the cabinet of the naturalift, fince they afford a confirmation of the theory which I have now mentioned. The greater part of thefe pearls have little or no luftre ; fome are round, oval, or elongated and cylindrical ; others are hemifpherical, refembling a button ; feveral oblong ones have a contraction towards the middle, which gives them the appearance of two joined together ; others alfo are fomewhat conical ; and all are of a pretty large fize, and of a pale and red or brown colour. The end of the pearl touching the tegument of the fhell, which forms what is called mother-of-pearl, is fo deeply impregnated with the fhining fubftance, that it exhibits a fingular contraft with the furrounding brown colour of the other parts, and feems to derive additional fplendour from it. This coating is of an orient bordering on rofe colour, which is extremely agreeable to the eye, and is therefore heightened in its effect by the contraft.

" Pearls of this kind are fo feldom met with, that they might at firft be taken for oculated agates prepared for being fet, or rather for *buffonites*, particularly thofe which have no mother-of-pearl. Their texture is very hard, and yields with great difficulty to the file.

" The

"The auger-worm, which occasions the formation of the pearls of Loch Tay, pierces the whole thickness of the shell, which is of considerable density and of a sallow brown colour: and, as the shelly juice oozes out from all parts of the orifice which the worm has formed, it necessarily results, that the pearl must participate in the quality and colour of the substance of the shell, from the exterior layer to that which lines and embellishes its inner surface.

"Hence originate those rude but singular gems above-mentioned, which have only a thin coating of mother-of-pearl upon one side. There, however, some instances in which the pearl is pure and brilliant throughout; proceeding probably from an extravasation of the interior coating only; which may have been occasioned by another kind of auger-worm attacking the shell solely in the direction of that coating. It is the province of those naturalists, whose attention it has more particularly engaged, to investigate more profoundly this very interesting subject, our knowledge of which must yet be considered as nothing more than a rude outline."

YELLOW FEVER.—To the Editor.

SIR, The public is greatly obliged to your correspondent, who, in your last (p. 343) gave a very enlightened account of the yellow fever, and has exhibited such a view of its origin, derived from history and common sense, as must be highly useful, if attended to, in suggesting the most effectual means of prevention. There is one particular, however, to which I beg to call his attention and that of the public. He alleges, that it originates in infection, which he has fully proved; but, it is not incompatible with this to conceive that a certain given state of the place to which it is imported is necessary to its taking effect. He has acknowledged the necessity of a certain given state of the air, inasmuch as it does not appear but at one season of the year in North America; but he denies that any thing depends on the state of places in point of cleanliness and the purity of the air. There is, however, a well-established fact, which alone is sufficient proof of the contrary. When the yellow fever was in New York last year, it did not prevail except in that part which is adjacent to the East River, and which is at the same time low and ill-drained, while that part of the town adjoining to the North River, which is more high and airy, was exempt from it. As it is of great importance, with a view to precautionary measures, that this should be well understood, as well as its being of a truly contagious nature, I am sure your candid and benevolent correspondent will give it due weight, and consider this part of the subject more fully in case he should favour the public with any farther communications.

DESCRIPTION of the VOLCANO at St. LUCIA.

MORE volcanoes are to be found in the West-India islands than in any other part of the globe; and, from the frequency of earthquakes, the abundance of hot springs, &c. in these islands, there is reason to conclude that those substances which are the cause of them still exist. On account of the great quantity of sulphur produced by the mountain where this crater is situated, the name of La

La Souffriere has been given to it and to the whole adjacent diſtrict. The mountain itſelf forms a part of a high ridge, which runs acroſs the whole iſland from north-eaſt to ſouth-weſt, and encloſes the crater like a baſon, which can be reached without great difficulty.— Thoſe who viſit it muſt put on thick-ſoaled boots, as the earth, before they have got to the diſtance of two miles from the town, becomes exceedingly hot; and they muſt carry nothing of metal with them, particularly ſilver, becauſe their ſplendour is deſtroyed by the vapour. The ſulphuriſed hydrogenous ſmell, which ſtill increaſes, begins at the diſtance of little more than half a mile from the town. But, however ſtrong this ſmell may be, it ſeems not to be prejudicial; for the inhabitants in the neighbourhood enjoy the beſt health, and attain to a conſiderable age. Though this diſtrict is mountainous and expoſed to inundations, it is very fruitful: its ſugar-canes produce the richeſt ſugar, as the diſtricts around Etna and Veſuvius produce the moſt celebrated wine. The nearer you approach the crater, the more numerous you find the volcanic productions. You paſs over various rivulets, the water of which has a ſulphureous ſmell, and the ſcum ſeems to contain ſaline and ochery matter. You ſoon after arrive at the ſide of the mountain which riſes over the volcano towards the ſouth-weſt. The road lies acroſs the declivity of the mountain, which is exceedingly ſteep; ſo that the traveller on one ſide ſees a terrible, almoſt perpendicular, abyſs filled with abundance of vapour from boiling water by which he is ſurrounded, and as it were enveloped: on the other ſide he is encloſed by a high ſteep rock, yet one can ride without danger to that part of the mountain which encloſes the volcano on the eaſt ſide; but, when you arrive there, you muſt procure a guide, and deſcend the mountain, by a very ſteep path, between low thick bruſh-wood. Throughout the whole way you muſt beat on both ſides with a ſtick, in order to guard againſt being bit by ſnakes. Scarcely have you reached the bottom of the mountain when you find the heat of the atmoſphere conſiderably increaſed, and the earth hot under the feet. The ſulphureous vapours which here ſurround the body ſoon occaſion an abundant perſpiration, and the ſulphuriſed hydrogenous ſmell is ſo powerful as to oblige many perſons to return. The valley which encloſes the volcano is about ſixty fathoms long, fifty broad, and lies ſixty fathoms higher than the level of ſea. It appears as if the volcano had long ago formed the hollow, in which it is ſituated, by ſplitting the mountain that ſurrounds the cavity, and by its eruption caſting to a diſtance on one ſide thoſe parts which covered the centre or focus. In looking down into the crater, great care muſt be taken that the ground, which rings below the feet, does not ſink, which would expoſe the legs to the danger of being burnt. For this reaſon it is uſual to ſend a guide before to point out the places that are ſecure, eſpecially when the weather is changeable; for people may then be ſpeedily ſurrounded by vapours that almoſt obſcure the ſun. It has alſo been remarked, that during rain the vapours are more abundant and thicker than at other times. It is difficult to ſay with any certainty what is the nature of the ſoil to be paſſed over in order to enter the crater; but it ſeems to conſiſt of decompoſed remains, or the ſcoriæ of different minerals, and particularly of pyrites, which however have changed their nature. As you advance farther, the ſurface of the earth appears more and more covered with ſulphur, and

and you find a number of ſmall ſpiracles, from which ariſes a burning vapour, and which are covered on the ſides with ſublimed ſulphur that has a very beautiful appearance. All theſe apertures may be conſidered as ſo many apparatuſes for diſtillation, which nature has prepared, in order to purify the ſulphur. If you ſtrike your ſtick againſt the ground in this ſpot, it occaſions a vent of that kind, through which the vapour iſſues with a ſtrong hiſſing noiſe, and ſo hot that it raiſes the thermometer ten degrees above the boiling point. From theſe apertures, whether the work of nature or of art, it appears that the whole ſurrounding diſtrict below the ſurface is filled with boiling water; but this water does not proceed from rain or from ſprings in the crater, but, in all probability, from the mountain which riſes above the volcano on the eaſtern ſide. This is the more credible, as the top of this mountain ends in a kind of funnel, which is of great width, and conſiſts of very marſhy ground. Several ſmall ſtreams iſſue from it alſo at different heights, and, after traverſing the ſurface of the crater, purſue their way through the valley, and diſcharge themſelves into the ſea. The water of all theſe ſtreams is exceedingly warm, and is covered with a multitude of air-bubbles, ſo that it ſparkles like champagne: theſe bubbles exhibit all the phenomena of oxygenous gas, which probably is diſengaged from the oxydes of various kinds with which it was combined in the earth. What among the phenomena of the crater excites moſt wonder are, twenty-two large baſons full of boiling water, ſome of them twenty feet in diameter, and which may be conſidered as monſtrous caldrons placed over the moſt violent fire: the ebullition is ſo ſtrong that water-bubbles of four or five feet in height are thrown up, which raiſe the thermometer far above the boiling point; but this however is the caſe only in thoſe where the water is from one to two feet in depth, though the depth in general amounts to eight or ten feet. You may walk round the edge of them without any danger, and contemplate at leiſure this aſtoniſhing quantity of boiling water. It is of a black colour, oily, covered with ſcum at the edges, and diffuſes a vapour which obſcures the atmoſphere. From this ebullition, and the high ſtate of the thermometer, we might be induced to believe that there is a great quantity of heat in theſe baſons; but, if you put your hand into the water, you will find the heat leſs than that of boiling water. The ebullition alſo may proceed only from the vapours which riſe from the bottom of the excavations with ſo much ſtrength that they give the water a boiling movement; and, in the like manner, the riſing of the thermometer ought to be aſcribed to theſe vapours alſo. The ſurface of the ground is of a pale yellow colour, and beſprinkled with a multitude of ſmall ſhining cryſtals, for the moſt part cryſtals of ſulphur. The upper part of the crater, towards the ſouth-eaſt, riſes exceeding ſteep, and is covered with a great number of other cryſtals lying in a kind of earth, which is partly calcareous, and partly of an unctuous nature like clay. Among theſe cryſtals there are ſome ſhaped like flat needles, and which are real cryſtals of ſulphat of lime. Others exhibit all the properties of ſulphat of alumine; others appear like ſulphat of iron, greatly ſuperſaturated with the acid; and others like ferruginous pyrites covered with an effloreſcence by the action of that atmoſphere and water. The above-mentioned ſubſtances muſt be conſidered as the principal cauſes of the violent commotions which

which appear in this crater. They are ſupplied from a large ſtratum of pyrites; and, from the violence of the combuſtion, we may conjecture that it muſt be very deep. It is probable alſo that this ſtratum is of conſiderable extent, for very hot ſprings are found at the diſtance of a mile both to the north and ſouth of the volcano. Such ſubſtances accumulated in different parts of the earth, when accidentally combined with other ſubſtances, ſuch as air, water, and inflammable bodies, produce earthquakes and other convulſions of nature. Though the internal re-action of theſe ſubſtances on one another ſeems to threaten danger, it however occaſions no damage to the colony, becauſe they have immediate communication with the atmoſphere, and the whole ſoil is penetrated by water ſo that it cannot take fire: neither are coal, bitumen, or ſuch inflammable bodies, found in the neighbourhood.

METHOD OF CATCHING WILD ELEPHANTS IN THE EAST INDIES.

IN the month of November, when the weather has become cool, and the ſwamps and marſhes, formed by the rains in the five preceding months, are leſſened, and ſome of them dried up, a number of people are employed to go in queſt of elephants.

At this ſeaſon the males come from the receſſes of the foreſt into the borders and outſkirts thereof, whence they make nocturnal excurſions into the plains in ſearch of food, and where they often deſtroy the labours of the huſbandman, by devouring and trampling down the rice, ſugar-canes, &c. that they meet with. A herd or drove of elephants, from what we can learn, has never been ſeen to leave the woods: ſome of the largeſt males often ſtray to a conſiderable diſtance; but the young ones always remain in the foreſt under the protection of the palmai, or leader of the herd, and of the larger elephants. The goondahs, or large males, come out ſingly, or in ſmall parties, ſometimes in the morning, but commonly in the evening; and they continue to feed all night upon the long graſs, that grows amidſt the ſwamps and marſhes, and of which they are extremely fond. As often, however, as they have an opportunity, they commit depredations on the rice-fields, ſugar-canes, and plantain-trees, that are near, which obliges the farmers to keep regular watch, under a ſmall cover, erected on the tops of a few long bamboos, about fourteen feet from the ground: and this precaution is neceſſary to protect them from the tigers, with which this province abounds. From this lofty ſtation the alarm is ſoon communicated from one watchman to another, and to the neighbouring villages, by means of a rattle with which each is provided. With their ſhouts and cries, and noiſe of the rattles, the elephants are generally ſcared and retire. It ſometimes, however, happens, that the males advance even to the villages, overturn the houſes, and kill thoſe who unfortunately come in their way, unleſs they have had time to light a number of fires: this element ſeems to be the moſt dreaded by wild elephants, and a few lighted wiſps of ſtraw or dried graſs ſeldom fail to ſtop their progreſs. To ſecure one of the males, a very different method is employed from that which is taken to ſecure a herd: the former is taken by koomkees, or female elephants trained for the purpoſe, whereas the latter is driven into a ſtrong encloſure called a Keddah.

As the hunters know the places where the elephants come out to feed, they advance towards them in the evening with four koomkees, which is the number of which each hunting party consists: when the nights are dark, (and these are the most favourable for their purpose,) the male elephants are discovered by the noise they make in cleaning their food, by whisking and striking it against their fore legs; and by moon-light they can see them distinctly at some distance.

As soon as they have determined on the goondah they mean to secure, three of the koomkees are conducted silently and slowly by their mahotes (drivers) at a moderate distance from each other, near to the place where he is feeding; the koomkees advance very cautiously, feeding as they go along, and appear like wild elephants, that have strayed from the jungle. When the male perceives them approaching, if he takes the alarm and is viciously inclined, he beats the ground with his trunk and makes a noise, shewing evident marks of his displeasure, and that he will not allow them to approach nearer; and, if they persist, he will immediately attack and gore them with his tusks; for which reason they take care to retreat in good time. But should he be amorously disposed, which is generally the case, (as these males are supposed to be driven from the herd at a particular period by their seniors, to prevent their having connection with the females of that herd,) he allows the females to approach, and sometimes even advances to meet them.

When, from these appearances, the mahotes judge that he will become their prize, they conduct two of the females, one on each side, close to him, and make them advance backwards, and press gently with their posteriors against his neck and shoulders: the third female then comes up and places herself directly across his tail; in this situation, so far from suspecting any design against his liberty, he begins to toy with the females and caress them with his trunk. While thus engaged, the fourth female is brought near, with ropes and proper assistants, who immediately get under the belly of the third female, and put a slight cord round his hind legs; should he move, it is easily broken; in which case, if he takes no notice of this slight confinement, nor appears suspicious of what was going forward, the hunters then proceed to tie his legs with a strong cord; which is passed alternately, by means of a forked stick and a kind of hook, from one leg to the other, forming the figure of 8; and, as these ropes are short, for the convenience of being more readily put around his legs, six or eight are generally employed, and they are made fast by another cord, which is passed a few turns perpendicularly between his legs, where the folds of the bundahs intersect each other. A strong cable with a running noose, sixty cubits long, is next put round each hind leg immediately above the bundahs, and again above them, six or eight additional bundahs, according to the size of the elephant, are made fast, in the same manner as the others were: the putting on these ropes generally takes up about twenty minutes, during which the utmost silence is observed, and the mahotes, who keep flat upon the necks of the females, are covered with dark-coloured clothes, which serve to keep them warm, and at the same time do not attract the notice of the elephant. While the people are busily employed in tying the legs of the goondah, he caresses sometimes one and sometimes another of the seducers, examining their

their beauties and toying with different parts, by which his desires are excited, and his attention diverted from the hunters, and in these amorous dalliances he is indulged by the females. But, if his passions should be so roused, before his legs are properly secured, as to induce him to attempt leaping on one of the females; the mahote, to insure his own safety and prevent him gratifying his desires any farther, makes the female run away, and at the same time, by raising his voice and making a noise, he deters the goondah from pursuing: this however happens very seldom, for he is so secured by the pressure of a koomkee on each side and one behind, that he can hardly turn himself, or see any of the people, who always keep snug under the belly of the third female, that stands across his tail, and which serves both to keep him steady and to prevent his kicking any of the people who are employed in securing him; but in general he is so much taken up with his decoyers, as to attend very little to any thing else. In case of accidents, however, should the goondah break loose, the people upon the first alarm can always mount on the backs of the tame elephants, by a rope that hangs ready for the purpose, and thus get out of his reach. When his hind legs are properly secured, they leave him to himself, and retire to a small distance: as soon as the koomkees leave him, he attempts to follow, but, finding his legs tied, he is roused to a proper sense of his situation, and retreats towards the jungle; the mahotes follow at a moderate distance from him, on the tame elephants, accompanied by a number of people that had been previously sent for, and who, as soon as the goondah passes near a stout tree, make a few turns of the phands, or long cables, that are trailing behind him, around its trunk: his progress being thus stopt, he becomes furious, and exerts his utmost force to disengage himself; nor will he then allow any of the koomkees to come near him, but is outrageous for some time, falling down and goring the earth with his tusks. If by these exertions the phands are once broken, which sometimes is effected, and he escapes into the thick jungle, the mahotes dare not advance for fear of the other wild elephants, and are therefore obliged to leave him to his fate; and in this hampered situation, it is said, he is even ungenerously attacked by the other wild elephants. As the cables are very strong and seldom give way, when he has exhausted himself by his exertions, the koomkees are again brought near and take their former positions, viz. one on each side and the other behind. After getting him nearer the tree, the people carry the ends of the long cables around his legs, then back and about the trunk of the tree, making, if they can, two or three turns, so as to prevent even the possibility of his escape. It would be almost impossible to secure an elephant in any other manner, as he would tear up any stake that could at the time be driven into the ground, and even the noise of doing it would frighten the elephant: for these reasons, nothing less than a strong tree is ever trusted to by the hunters. For still farther security, as well as to confine him from moving to either side, his fore-legs are tied exactly in the same manner as the hind-legs were, and the phands are made fast, one on each side, to trees or stakes driven deep into the earth. During the process of tying both the hind and fore-legs, the fourth koomkee gives assistance where necessary, and the people employed cautiously avoid going within reach of his trunk; and, when he attempts to

seize

seize them, they retreat to the opposite side of the koomkees, and get on them, if necessary, by means of the rope above-mentioned, which hangs ready for them to lay hold of. Although by these means he is perfectly secured and cannot escape, yet as it would be both unsafe and inconvenient to allow him to remain in the verge of the jungle, a number of additional ropes are afterwards put on, as shall be mentioned, for the purpose of conducting him to a proper station. When the goondah has become more settled, and eats a little food, with which he is supplied as soon as he is taken, the koomkees are again brought near, and a strong rope is then put twice round his body, close to his fore-legs, like a girth, and tied behind his shoulder; then the long end is carried back close to his rump, and there fastened, after a couple of turns more have been made round his body. Another cord is next fastened to the pharah, and from thence carried under his tail like a crupper, and brought forward and fastened by a turn or two to each of the pharahs, or girths, by which the whole is connected, and each turn of these cords serves to keep the rest in their places. After this a strong rope is put round his buttocks, and made fast on each side to the girth and crupper, so as to confine the motion of his thighs and prevent his taking a full step. These smaller ropes being properly adjusted, a couple of large cables with running nooses are put around his neck, and, after being drawn moderately tight, the nooses are secured from running closer, and then tied to the ropes on each side forming the girth and crupper already-mentioned; and thus all these ropes are connected and kept in their proper places, without any risk of the nooses of the dools becoming tight, so as to endanger the life of the elephant in his exertions to free himself. The ends of these cables are made fast to two koomkees, one on each side of the goondah, by a couple of turns round the belly, close to the shoulder, like a girth, where a turn is made, and it is then carried across the chest and fastened to the girth on the opposite side. Every thing being now ready, and a passage cleared from the jungle, all the ropes are taken from his legs, and only the tooman remains round his buttocks to confine the motion of his hind legs: the koomkees pull him forward by the dools, and the people from behind urge him on. Instead of advancing in the direction they wish, he attempts to retreat farther into the jungle; he exerts all his force, falls down and tears the earth with his tusks, screaming and groaning, and by his violent exertions often hurts and bruises himself very much; and instances happen of their surviving these violent exertions only a few hours, or at most a few days. In general, however, they soon become reconciled to their fate, will eat immediately after they are taken, and, if necessary, may be conducted from the verge of the jungle as soon as a passage is cleared. When the elephant is brought to his proper station and made fast, he is treated with a mixture of severity and gentleness, and in a few months (if docile) he becomes tractable, and appears perfectly reconciled to his fate. It appears somewhat extraordinary, that though the goondah uses his utmost force to disengage himself when taken, and would kill any person coming within his reach, yet he never or at least seldom attempts to hurt the females that have ensnared him; but on the contrary seems pleased, (as often as they are brought near, in order to adjust his harnessing, or move and slacken those ropes which gall him,) soothed and comforted

forted by them, as it were, for the lofs of his liberty. All the elephants, foon after they are taken, are led out occafionally for exercife by the koomkees, which attend for that purpofe.

Having now related the manner in which the male elephants, called Goondahs, are fecured; we fhall next defcribe the methods employed for fecuring a herd of wild elephants. Female elephants are never taken fingly, but always in the herd, which confifts of young and old of both fexes. This noble, docile, and ufeful, animal, feems naturally of a focial difpofition, as a herd in general confifts of from about forty to an hundred, and is conducted under the direction of one of the oldeft and largeft females, called the *palmai*, and one of the largeft males. When a herd is difcovered, about five hundred people are employed to furround it, who divide themfelves into fmall parties, called Chokeys, confifting generally of one mahote and two coolies, at the diftance of twenty or thirty yards from each other, and form an irregular circle in which the elephants are inclofed: each party lights a fire and clears a foot-path to the ftation that is next him, by which a regular communication is foon formed through the whole circumference from one to the other. By this path reinforcements can immediately be brought to any place where an alarm is given; and it is alfo neceffary for the fuperintendants, who are always going round to fee that the people are alert upon their pofts. The firft circle (the dawkee) being thus formed, the remaining part of the day and night is fpent in keeping watch by turns, or in cooking for themfelves and companions. Early next morning one man is detached from each ftation, to form another circle in that direction where they wifh the elephants to advance. When it is finifhed, the people ftationed neareft to the new circle put out their fires and file off to the right and left, to form the advanced party, thus leaving an opening for the herd to advance through; and by this movement, both the old and new circle are joined and form an oblong. The people from behind now begin fhouting and making a noife with their rattles, tomtoms, &c. to caufe the elephants to advance; and, as foon as they are got within the new circle, the people clofe up, take their proper ftations, and pafs the remaining part of the day and night as before. In the morning the fame procefs is repeated; and in this manner the herd advances flowly in that direction where they find themfelves leaft incommoded by the noife and clamour of the hunters, feeding, as they go along, upon branches of trees, leaves of bamboos, &c. which come in their way. If they fufpected any fnare, they could eafily break through the circle; but this inoffenfive animal, going merely in queft of food, and not feeing any of the people who furround him, and who are concealed by the thick jungle, advances without fufpicion, and appears only to avoid being peftered by their noife and din. As fire is the thing elephants feem moft afraid of in their wild ftate, and will feldom venture near it, the hunters always have a number of fires lighted, and particularly at night, to prevent the elephants coming too near, as well as to cook their victuals and keep them warm. The fentinels fupply thefe fires with fuel, efpecially green bamboos, which are generally at hand, and which, by the crackling and loud report they make, together with the noife of the watchmen, deter the elephants from coming near; fo that the herd generally remains at a diftance near the centre of the circle.

Should

Should they at any time advance, the alarm is given, and all the people immediately make a noiſe and uſe their rattles to make them keep at a greater diſtance. In this manner they are gradually brought to the keddah, or place where they are to be ſecured. As the natives are extremely ſlow in their operations, they ſeldom bring the herd above one circle in a day, except on an emergency, when they exert themſelves and advance two circles. They have no tents or covering but the thick woods, which, during the day, keep off the rays of the ſun; and at night they ſleep by the fires they have lighted, upon mats ſpread on the ground, wrapt up in a piece of coarſe cloth. The ſeaſon is then ſo mild that the people continue very healthy; and an accident ſeldom happens except to ſtragglers about the outſkirts of the wood, who are ſometimes, though very rarely, carried off by tigers. The keddah, or place where the herd is to be ſecured, is differently conſtructed in different places; here it conſiſts of three encloſures, communicating with each other by means of narrow openings or gateways. The outer encloſure, or the one next to the place where the elephants are to enter, is the largeſt; the middle one is generally, though not always, the next in ſize; and the third, or farthermoſt, is the ſmalleſt. Theſe proportions, however, are not always adhered to in the making of a keddah, nor indeed does there appear to us any reaſon for making three encloſures: but, as our intentions are merely to relate facts, we ſhall proceed to obſerve, that, when in the third or laſt encloſure, the elephants are then only deemed ſecure; here they are kept ſix or eight days, and are regularly though ſcantily fed from a ſcaffold on the outſide, cloſe to the entrance of an outlet called the Roomee, which is about ſixty feet long and very narrow, and through which the elephants are to be taken out one by one. In many places this mode is not adopted; for, as ſoon as the herd has been ſurrounded by a ſtrong paliſade, koomkees are ſent in with proper people, who tie them on the ſpot, in the ſame manner as was mentioned above of the goondahs, or male elephants, that are taken ſingly. Theſe encloſures are all pretty ſtrong; but the third is the ſtrongeſt, nor are the elephants deemed ſecure, as already obſerved, till they have entered it. This encloſure has, like the other two, a pretty deep ditch on the inſide; and, upon the bank of the earth, that is thrown up from the excavation, a row of ſtrong paliſades of middle-ſized trees is planted, ſtrengthened with croſs bars, which are tied to them about the diſtance of fourteen inches from each other; and theſe are ſupported on the outſide by ſtrong poſts like buttreſſes, having one end ſunk in the earth and the other preſſing againſt the croſs bars to which they are faſtened. When the herd is brought near to the firſt encloſure, or baigcote, which has two gateways towards the jungle, from which the elephants are to advance, (theſe, as well as the other gateways, are diſguiſed with branches of trees and bamboos ſtuck in the ground ſo as to give them the appearance of a natural jungle,) the greateſt difficulty is to get the herd to enter the firſt or outer encloſure; for, notwithſtanding the precautions taken to diſguiſe both the entries as well as the paliſade which ſurrounds this encloſure, the palmai, or leader, now appears to ſuſpect ſome ſnare, from the difficulty and heſitation with which in general ſhe paſſes into it; but, as ſoon as ſhe enters, the whole herd implicitly follows. Immediately, when they have all paſſed the

gateway,

gateway, fires are lighted round the greateſt part of the encloſure, and particularly at the entries, to prevent the elephants from returning. The hunters from without then make a terrible noiſe by ſhouting, beating of tomtoms (a kind of drum), firing blunt cartridges, to urge the herd on to the next encloſure. The elephants, finding themſelves enſnared, ſcream and make a noiſe; but, ſeeing no opening except the entrance to the next encloſure, and which they at firſt generally avoid, they return to the place through which they lately paſſed, thinking perhaps to eſcape, but now find it ſtrongly barricaded; and, as there is no ditch at this place, the hunters, to prevent their coming near and forcing their way, keep a line of fire conſtantly burning all along where the ditch is interrupted, and ſupply it with fuel from the top of the paliſade; and the people from without make a noiſe, ſhouting and hallooing, to drive them away. Whenever they turn, they find themſelves oppoſed by burning fires, or bundles of reeds and dried graſs, which are thruſt through the opening of the paliſades, except towards the entrance of the ſecond encloſure, or doobraze-cote. After traverſing the Baigcote for ſome time, and finding no chance of eſcaping but through the gateway into the next encloſure, the leader enters, and the reſt follow: the gate is inſtantly ſhut by people who are ſtationed on a ſmall ſcaffold immediately above it, and ſtrongly barricaded, fires are lighted, and the ſame diſcordant din made and continued, till the herd has paſſed through another gateway into the laſt encloſure, or rajecote, the gate of which is ſecured in the ſame manner as the former was. The elephants, being now completely ſurrounded on all ſides, and perceiving no outlet through which they can eſcape, appear deſperate, and in their fury advance frequently to the ditch in order to break down the paliſade, inflating their trunks, ſcreaming louder and ſhriller than any trumpet, ſometimes grumbling like the hollow murmur of diſtant thunder; but, wherever they make an attack, they are oppoſed by lighted fires, and by the noiſe and triumphant ſhouts of the hunters. As they muſt remain ſome time in this encloſure, care is always taken to have part of the ditch filled with water, which is ſupplied by a ſmall ſtream, either natural, or conducted through an artificial channel from ſome neighbouring reſervoir. The elephants have recourſe to this water to quench their thirſt and cool themſelves after their fatigues, by ſucking the water into their trunks, and then ſquirting it over every part of their bodies. While they remain in this encloſure, they continue ſulky, and ſeem to meditate their eſcape; but the hunters build huts, and form an encampment as it were around them cloſe to the paliſade; watchmen are placed, and every precaution uſed to prevent their breaking through. This they would ſoon effect, if left to themſelves, notwithſtanding the paliſade is made of very ſtrong ſtakes ſunk into the earth on the outſide of the ditch, and ſtrengthened by croſs bars and buttreſſes as already-mentioned.

When the herd has continued a few days in the keddah, the door of the roomee is opened, into which ſome one of the elephants is enticed to enter, by having food thrown firſt before, and then gradually farther on into the paſſage, till the elephant has advanced far enough to admit of the gate's being ſhut. Above this wicker-gate, or door, two men are ſtationed on a ſmall ſcaffold, who throw down

down the food. When the elephant has paſſed the door, they give the ſignal to a man who from without ſhuts it by pulling a ſtring, and they ſecure it by throwing two bars that ſtood perpendicular on each ſide, the one acroſs the other thus ×, forming the figure of St. Andrew's Croſs; and, then two ſimilar bars are thrown acroſs each other behind the door next to the keddah, ſo that the door is in the centre: for farther ſecurity, horizontal bars are puſhed acroſs the roomee, through the openings of the paliſades, both before and behind thoſe croſſes, to prevent the poſſibility of the door's being broken. The roomee is ſo narrow that a large elephant cannot turn in it; but, as ſoon as he hears the noiſe that is made in ſhutting the gate, he retreats backwards, and endeavours to force it: being now ſecured in the manner already noticed, his efforts are unavailing. Finding his retreat thus cut off, he advances and exerts his utmoſt force to break down the bars, which were previouſly put acroſs a little farther on in the outlet, by running againſt them, ſcreaming and roaring, and battering them, like a ram, by repeated blows of his head, retreating and advancing with the utmoſt fury. In his rage he riſes and leaps upon the bars with his fore-feet, and ſtrives to break them down with his huge weight. In February 1788 a large female elephant fell down dead in the roomee, from the violent exertions ſhe made. When the elephant is ſomewhat fatigued by theſe exertions, ſtrong ropes with running nooſes are placed in the outlet by the hunters; and, as ſoon as he puts a foot within the nooſe, it is immediately drawn tight and faſtened to the paliſades. When all his feet have been made pretty faſt, two men place themſelves behind ſome bars that run acroſs the roomee to prevent his kicking them, and with great caution tie his hind-legs together, by paſſing a cord alternately from the one to the other, like the figure 8, and then faſtening theſe turns as above deſcribed. After this, the pharah, dools, &c. are put on in ſucceſſion, in the ſame manner as on the goondah, only that here the people are in greater ſecurity. While theſe ropes are making faſt, the other hunters are careful not to go too near, but keep on the outſide of the paliſade, and divert his attention as much as they can from thoſe employed in faſtening them, by ſupplying him with graſs, and ſometimes with plantain-leaves and ſugar-canes, of which he is remarkably fond, by preſenting a ſtick, giving him hopes of catching it, or by gently ſtriking or tickling his proboſcis. He frequently, however, ſeizes the ropes with his trunk, and endeavours to break them, particularly thoſe with which his feet are tied, and ſometimes tries to bite them through with his grinders (as he has no inciſors or front teeth); but the hunters then goad him with ſharpened bamboos, or light ſpears, ſo as to make him quit his hold. Thoſe who are employed in putting the ropes around his body, and over his head, ſtand above him, on a ſmall kind of platform, conſiſting of a few bars run acroſs through the openings of the paliſades; and, as an elephant cannot ſee any thing that is above, and rather behind his head, they are very little incommoded by him, although he appears to ſmell them, and endeavours to catch them with his trunk. When the whole apparatus is properly ſecured, the ends of the two cables (dools) which were faſtened round his neck, are brought forward to the end of the roomee, where two female elephants are waiting; and to them theſe cables are made faſt. When every thing is ready, the door at the end

end of the outlet is opened, the crofs bars are removed, and the paffage left clear. The ropes that tied his legs to the palifades are loofened, and, if he does not advance readily, they goad him with long poles fharpened at the ends or pointed with iron, and urge him on with their noife and din, and at the fame time the females pull him gently forward: as foon as he has cleared the Roomee, his conductors feparate; fo that if he attempts to go to one fide, he is prevented by the elephant that pulls in the oppofite direction, and *vice verfa*. The bundahs, which tie his hind-legs, though but loofely, yet prevent his going faft; and, thus fituated, he is conducted like an enraged bull that has a cord faftened to his horns on each fide, fo that he cannot turn either to the right or left to avenge himfelf. In like manner is this noble animal led to the next tree, as the goondahs before-mentioned were. Sometimes he becomes obftinate, and will not advance; in which cafe, while one of his conductors draws him forward, the other comes behind and pufhes him on: fhould he lie down, fhe puts her fnout under and raifes him up, fupporting him on her knee, and with her head pufhing him forward with all her ftrength; the hunters likewife affift by goading him, and urging him forward by their noife and din; fometimes they are even obliged to put lighted torches near, in order to make him advance. In conducting fmall elephants from the roomee, only one cable and one koomkee are made ufe of. As foon as each elephant is fecured, he is left in charge to the mahote, or keeper, who is appointed to attend and inftruct him; and, under him, there are from two to five coolies, according to the fize of the elephant, in order to affift and to fupply food and water, till he becomes fo tractable as to bring the former himfelf. Thefe people erect a fmall hut immediately before him, where the mahote, or one of the coolies, conftantly attends, fupplies him with food, and foothes and careffes him by a variety of little arts. Sometimes the mahote threatens and even goads him with a long ftick pointed with iron, but more generally coaxes and flatters him, fcratching his head and trunk with a long bamboo fplit at one end into many pieces, and driving away the flies from any fores occafioned by the hurts and bruifes he got by his efforts to efcape from the roomee. This animal's fkin is foft, confidering his fize; is extremely fenfible, and is eafily cut or pierced, more fo than the fkin of moft large quadrupeds. The mahote likewife keeps him cool, by fquirting water all over him, and ftanding without the reach of his trunk: in a few days he advances cautioufly to his fide, and ftrokes and pats him with his hand, fpeaking to him all the while in a foothing tone of voice, and in a little time he begins to know his keeper and obey his commands. By degrees the mahote becomes familiar to him, and at length gets upon his back from one of the tame elephants, and, as the animal becomes more tractable, he advances gradually forward, towards his head, till at laft he is permitted to feat himfelf on his neck, from which place he afterwards regulates and directs all his motions. While they are training in this manner, the tame elephants lead out the others in turn, for the fake of exercife, and likewife to eafe their legs from the cords with which they are tied, and which are apt to gall them moft terribly unlefs they are regularly flacked and fhifted. In five or fix weeks the elephant becomes obedient to his keeper, his fetters are taken off by degrees, and generally in about five or fix months he

ſuffers himſelf to be conducted by the mahote from one place to another: care, however, is always taken not to let him approach his former haunts, leſt a recollection of the freedom he there enjoyed ſhould induce him again to recover his liberty. This obedience to his conductor ſeems to proceed partly from a ſenſe of generoſity, as it is in ſome meaſure voluntary; for, whenever an elephant takes fright, or is determined to run away, all the exertions of the mahote cannot prevent him, even by beating or digging the pointed iron hook into his head, with which he directs him; on ſuch an occaſion the animal ſeems to diſregard theſe feeble efforts, otherwiſe he would ſhake or pull him off with his trunk, and daſh him in pieces. Accidents of this kind happen almoſt every year, eſpecially to thoſe mahotes who attend the large goondahs; but ſuch accidents are in general owing entirely to their own careleſſneſs and neglect. It is neceſſary to treat the males with much greater ſeverity than the females, to keep them in awe; but it is too common a practice among the mahotes, either to be negligent in uſing proper meaſures to render their elephants docile, or to truſt too much to their good nature before they are thoroughly acquainted with their diſpoſitions. The iron hook, with which they direct him, is pretty heavy, about ſixteen inches long, with a ſtraight ſpike advancing a little beyond the curve of the hook, ſo that altogether it is exactly like that which ferrymen or boatmen uſe faſtened to a long pole.

In this account of the proceſs for catching and taming elephants, we have uſed the maſculine gender to avoid circumlocution, as both males and females are treated in the ſame manner: the former are ſeldom ſo docile, but, like the males of other animals, are fiercer, ſtronger, and more untractable, than the females.

Before we conclude, it may be proper to obſerve, that young elephants ſuck conſtantly with their mouths, and never with their trunks, as Buffon has aſſerted; a concluſion he made merely from conjecture, and the great and various uſes to which they are well adapted and applied by every elephant.

The mode of connection between the male and female is now aſcertained beyond the poſſibility of a doubt; as Mr. Buller, Lieut. Hawkins, and many others, ſaw a male copulate with a female, after they were ſecured in the keddah, in a manner exactly ſimilar to the conjunction of the horſe with a mare. This fact entirely overturns what has been ſo often related concerning the ſuppoſed delicacy of this uſeful animal, and a variety of other hypotheſes, which are equally void of foundation. The exact time an elephant goes with young, has not yet been aſcertained, but it cannot be leſs than two years, as an elephant brought forth a young one twenty-one months and three days after ſhe was taken. She was obſerved to be with young in April or May 1788, and ſhe was only taken in January preceding; ſo that it is very likely ſhe muſt have had connection with the male ſome months before ſhe was ſecured, otherwiſe they could not diſcover that ſhe was with young, as a fœtus of leſs than ſix months cannot well be ſuppoſed to make any alteration in the ſize or ſhape of ſo large an animal. The young one, a male, was produced October 16, 1789, and appeared in every reſpect to have arrived at its full time. He was thirty-five inches high at his birth, and grew four inches in nearly as many months. Elephants are always meaſured at the ſhoulder; for the arch or curve of the back,

of

of young ones particularly, is conſiderably higher than any other part, and it is a ſure ſign of old age whenever this curve is found flattened or conſiderably depreſſed, after an elephant has once attained his full growth.

Though theſe remarks, as well as ſeveral others in the above relation, do not come within the plan propoſed, which was merely to deſcribe the method of taking wild elephants in the province of Tipura, yet we hope they will not be deemed impertinent or ſuperfluous, eſpecially as ſeveral of them tend to eſtabliſh ſome important facts in the natural hiſtory of this animal, that are not generally known, or little attended to in the accounts hitherto publiſhed.

ROYAY ACADEMY, SOMERSET HOUSE, 1799.

THE anniverſary dinner of the Royal Academy and Aſſociates, on the 27th of April, previous to the opening of the Annual Exhibition of Pictures, &c. &c. was attended by a more numerous company than on any former occaſion. Among the viſitors and *amateurs* of the fine arts, were, his Royal Highneſs the Duke of Kent; Duke of Norfolk, the Marquis of Abercorn, the Earls of Suffolk, Harcourt, and Beſborough; Lords Carysfort, Grey de Wilton, Holland, and Sheffield; Biſhop of Rocheſter; Imperial and Swediſh Ambaſſadors; Sir Joſeph Banks, Sir George Beaumont, Sir Abraham Hume, Sir William Young, Sir Harry Inglefield, and Sir John Leiceſter; Colonels Smith and Elford; Meſſrs. H. Dundas, Long, Canning, Windham, Charles Pybus, Roſe, Elmſley, Udney, Godfrey, Thornton, de Calonne, William Smith, Deſenfans, Price, Steevens, Malone, Pye, Aldermen Boydell and Clarke, and the two Meſſrs. Locke.

The company was ſo numerous that it was found neceſſary to provide an additional table, and about two hundred ſat down to dinner. The Duke of Kent came in full uniform, attended by his aide-de-camp. His health was propoſed by the preſident, and drunk ſtanding. The preſident then, at the requeſt of the duke, thanked the company in his name, and his royal highneſs roſe and drank the health of the aſſembly. After a ſhort interval, the duke propoſed "Succeſs to the arms of Archduke Charles," which was received with the moſt lively acclamation, and Mr. Knyvett gave an appropriate ſong.

The motto is taken from Quintilian, and, though deſcriptive of the juſt claims which the excellence of antiquity poſſeſſes to the veneration and gratitude of the moderns, might certainly be applied with as much juſtice to many other inſtitutions as the Royal Academy. There is in it nothing ſtrikingly characteriſtic of the object to which it ſerves as an index: "Tot nos præceptoribus, tot exemplis, inſtruxit antiquitas, ut poſſit videri nulla ſorte naſcendi ætas felicior quàm noſtra, cui docendæ priores elaboraverunt." It could unqueſtionably be no inſult to the erudition or wiſdom of the academy, to ſet themſelves free, at leaſt occaſionally, from the claſſical fetters which ſeem to have been forged for them by Cicero, Quintilian, Longinus, &c. and to chooſe from ſome of our own writers a motto pertinent to their views, and illuſtrative of their labours.

The Exhibition is allowed by the beſt judges to contain, this year, more collective merit that it diſplayed the laſt two ſeaſons.

It

It may not be unneceſſary to obſerve, that the boaſted diſcovery of a preparation, by which it was ſuppoſed the profeſſors of the Venetian ſchool prepared their canvas, has failed in producing the effect propoſed, and that the generality of our artiſts now rely on their own ſkill and experience, in giving to their productions force and brilliancy of colouring.

The preſident, Mr. Weſt, who is not ſurpaſſed in induſtry by any of his brother artiſts, has furniſhed nine pictures for the preſent Exhibition. His deſign is correct in all the *minutiæ* of the art, and his colouring has acquired a greater glow, and a more faſcinating hue, than moſt of his former pieces. His beſt production is the Nativity, a cartoon, deſigned for the collegiate church at Windſor. There exiſts throughout a chaſte and animated ſtile of expreſſion that is perfectly conſonant to the ſubject.

Weſtall's drawings continue to hold that diſtinguiſhed rank to which they have been long entitled, but his pictures are devoid of the outlines of ſymmetry, and filled in a crude and imperfect manner.

The Tired Soldier of Opie is in every reſpect one of the fineſt paintings in the exhibition. Finiſhed according to the pureſt principles of the art, it abounds in beauties that are the genuine characteriſtics of genius and ſenſibility.

Sir Francis Bourgeois has three landſcapes, very diſtinct in their nature. They are all excellent, but his Landſcape and Cattle at Sun-Riſe diſplays a glow of tint, a profound knowledge of light and ſhade, and a combination of powers which are rarely to be matched.

Smirke has been uncommonly ſucceſsful both in the drawing and colouring of his ſketch from Don Quixote, which combines ſpirited and ſtriking execution with the whimſical and ludicrous.

The Land-ſtorm of Loutherbourg is replete with a variety of beauties which cannot be eaſily deſcribed, but are felt by the connoiſſeur on the firſt view.

Gilpin's gift to the academy, on his admiſſion as a member, of Horſes frightened by flaſhes of lightning, is a teſtimony creditable to his own talents, and worthy of being preſerved by the ſociety.

Treſham has employed his pencil on a ſcriptural ſubject, and has given to Chriſt, in his conference with Nicodemus, a dignity and impreſſion that exemplify the dignity of the topic which he undertook to handle.

Turner, a young artiſt, who diſtinguiſhed himſelf laſt exhibition by a variety of excellent pieces, continues to ſupport the reputation which he has acquired.

We have only one piece from Fuſeli, and that is allegorical. The ſubject is the Cave of Spleen, from Pope's Rape of the Lock; and, though objectionable in ſome points, it is however entitled to a conſiderable degree of encomium.

De Wild retains his ſuperiority in the expreſſion of dramatic character, and his portraits of Munden and Fawcett are highly deſcriptive of the reſpective parts in which they are drawn.

Sir George Beaumont has not indulged the amateurs this ſeaſon with a ſingle landſcape; but he has furniſhed a very ſtriking picture of a Woman, living in a bleak ſituation, expoſed to the inclemency of the weather.

Among the portrait-painters, Sir William Beechy, Lawrence, Hoppner, Shee, and Northcote, are the principal. Sir William Beechy's

Beechy's portrait of Mr. Kemble the actor, and Lawrence's picture of Miſs Jennings, which is a whole length, are their beſt. Shee has been peculiarly happy in his Portrait of an Officer. There is in the man and the horſe an uncommon grandeur of outline, and a boldneſs of effect, which he has ſeldom produced before.

The ſculptural pieces of Nollekens, Banks, and Bacon, are full of taſte and correctneſs; and, among the architectural deſigns, thoſe of Wyatt and Bonami take the lead.

LETTER WRITTEN TO A MINISTER WHO WAS VERY FOND OF USING HARD WORDS IN HIS SERMONS.

SIR, The unanimous and humillimous deſideration, as well of your parochian as hicceubiquitarian illiterate ſemipaganian auditors, ſubmiſſively demonſtrateth, That although your ſpacious proemiums, and ſpecious introduction of premiſed perſpicuity in prædication, do inveigle our affections, for the meliorating of our minds, and indoctrinating our agricolated intellects, and do engage our acroamatic organs, and infix our ophthalms for the better inhibition of the ſtellicides of your beatifying inſtruction, yet, through the calliginous ſublimity of internexed conundrums, tonitruating with obſtreperous cadencies, you rather inanimate and obfuſcate, than illuminate and ſcientificate, our abecedarian conceptions, ſo that commonly we return as plentifully unedified, as when we came :—We, therefore, out of the ſenſe of our ſoul's good and benefiting by your miniſtry, in bonne eſperance that your urbanity will not be exaſperated at the preſentation of theſe our cordial deſires, do, from the nadir of our ruſticity, almacanterize to the very zenith of your unparallelled ſphere of activity, in conjunctively requeſting that your ingenious genius would be placentiated to nutriate our animal appetites with intelligible theology, ſuitable to our moſt paidonatical apprehenſions, and to recondite your ſacrocondite locutions for more ſcholaſtic auſcultators and ſcholiaſts, and that ourſelves, ſecond-ſelves, junior ones, and ſervants, all of ignoramus's offspring, may not hear you evaporate in lycophronian cantharus, and gigantize in farraginous raptures, words we never met with in holy writ, as corollaries, ephemeris, and ſuch other ſyſſegiſts, or heterogeneal language ; for that, without dilucidation of their genuine ſignification, we loſe the gravy and ſyſtem of your doctrine, and our common-ſenſe is admiring at the words we underſtand not. Being therefore anguſtiated with a panic timidity of another Babel's reſtoration, or leſt ſome ſeſquiqepalian ſaltembanco ſhould be circumforaneate, or the ſpagyric bombaſt of holienliem have experimented a metempſychoſis, to repuzzle the quinteſſentials of our ingenioſities with more amalgamas, cohobations, and fixations, we ſhall quote St. Auſtin's ſaying, *Mallem ut reprehendant grammatici quam non intelligant populi*; and we wiſh it may be your practice.

And now, eximious ſir, we ſupplicate your clemency not to look upon theſe lines as derogatory to your moſt exquiſite parts, for we rather magnify and admire ſuch egregious acquiſitions, as being very ſuitable, and much in requeſt ; and of ſuch Solomon's exclamation doth well, otherwiſe St. Paul's exprobation of barbariſm may be injected, or the help of an interpreter required. *Qui loquitur linguâ ſcipſum*

ſcipſum ædificat; *nam tibi benefacias, ſed aliis non ædificatur : ſed verbum ſat ſapienti.* And thus, having copulated our plebeian endeavours, we exoſculate the ſubumbration of your ſubligacles; and ſooner ſhall the ſurges of the areniferous ſea ignify and evaporate, than the chain of our duty be in the leaſt unconcatenated or diſſolved; always wiſhing you health and happineſs, &c.

CELIBACY OF THE FELLOWS OF COLLEGES.

IT has long been a cauſe of complaint, that the reſtriction of celibacy laid upon fellows of colleges, has not been aboliſhed in both of our univerſities. A grace was lately propoſed in the Cambridge ſenate, but without ſucceſs. That a claſs of men who are expected to ſet an example of virtue and irreproachable conduct, ſhould be excluded from a mode of life diſallowable to no other, is contrary to the dictates of Nature, and hoſtile to the improvement of religion and morality. Unleſs it can be denied that clergymen are endued with paſſions ſimilar to other men, no juſt argument can be alleged in favour of ſuch an exception. We know there will be many adverſaries to encounter, many obſtacles to ſurmount, before this object can be carried into effect. We know that there are many amongſt you, who, having paſſed, as it were, their meridian, will diſcountenance it in toto; many will treat it with lukewarmneſs; yet many, we truſt, there are, who will be ready to eſpouſe its cauſe.

Amongſt the objections ſtarted againſt this propoſal, one of the principal ſeems to be, that the ſucceſſion will become ſlower in every college; we grant it may be ſo, yet the vacancies occaſioned by marriage are comparatively ſo very few, that no very material difference will be felt in this reſpect.

Others plead that the univerſity will be rendered a ſcene of confuſion, and that there will be an interruption to the diſcipline of it, when it is filled with the families of the collegians.

Others aſſert, on the contrary, that the univerſity will be deſerted by its profeſſors. But both theſe diſadvantages may be guarded againſt by proper regulations.

Let us now conſider the evils that ariſe from this reſtriction: and here it cannot be denied, that it opens a door to perjury and immorality. A clergyman, reſpectable perhaps in every other inſtance, when debarred from the happineſs and comfort of an honourable connection, is induced to enter into one of an improper kind, which, if known, renders him an object of cenſure and diſreſpect. He gets preferment at a time of life when he cannot relinquiſh his old habits, and ſits down at his living unenjoyed when obtained, becauſe he thinks it too late to form a new connexion. Others there are, who, having at an early period engaged themſelves to women of amiable manners and genteel education, are compelled to make up their minds to celibacy, till they get preferment from their college. Others again there are, who are tempted to infringe the laws of their reſpective ſocieties, and clandeſtinely to commit an offence which may poſſibly appear to them to be a venial one.

Let the preſent members of our learned ſocieties be the objects of our attention, and ſome method may hereafter be deviſed to remove any detriment that might accrue to their ſucceſſors.

Let

Let this propofal be allowed to pafs the caput, that the fair opinion of the two univerfities at large may be canvaffed, and let the heads exert themfelves in fupport of a caufe which, both in a religious and moral point of view, feems fo highly interefting and important. The following arrangements are recommended: 1ft. Let the fellows be allowed to marry after fo many years ftanding. 2d. Let them not be allowed to bring their families either into the univerfity, or within a certain diftance. 3d. Let fo many whofe attendance is required for the inftruction and care of the ftudents, be compelled to refidence in their refpective turns. 4th. Let every fellow vacate his fellowfhip, upon inftitution to any ecclefiaftical benefice, upon fucceeding to an eftate either real or perfonal, on accepting a place under government for life, or an annuity of a certain value, &c. &c.

OBSERVATIONS ON THE WINTER SLEEP OF ANIMALS AND PLANTS.

THE winter fleep is a very fingular property of animals and plants; and, though it occurs daily before our eyes, we are not able to explain the phenomena with which it is attended. In cold countries many animals, on the approach of winter, retire to their fubterranean abodes, in which they bury themfelves under the fnow, where they remain five or fix months without nourifhment or motion; nay, almoft without circulation of their blood, which flows only fluggifhly and in the wideft veffels. Their perfpiration is almoft imperceptible: but ftill they lofe fomething by it; as they enter their winter quarters in very good condition, and are exceedingly thin when they return from them.

Some animals enjoy their winter fleep under the earth, and others concealed below the fnow; fome for the fame purpofe creep into the holes of rocks, and others below ftones or the bark of trees. Some kinds, fuch as fwallows and frogs, can pafs the winter in marfhes under the water. In this ftate many of thofe expofed to the feverity of the open air are deftroyed by the froft when it is violent; and, even fome of thofe which have buried themfelves fhare the like fate.

Plants have their winter fleep alfo; for, during the period of winter, their fap flows towards the root, and the circulation of it, which is very flow, takes place only in the wideft veffels. Were the expanfion of the fap in winter as confiderable as in fummer, it would burft all the veffels on being frozen.

Several obfervers have endeavoured to prove that this fingular circumftance is merely accidental; and, indeed, no difference is found in the internal organization of thofe animals which have winter fleep, and thofe which have not. It is very remarkable that this property belongs in general to animals of prey. As thefe have far ftronger powers of digeftion, and ftronger digeftive juices, it would appear that abftinence from food for feveral months would to them be hardly poffible.

The bear, the bat, and the hedge-hog, have winter fleep; but the white bear has not. As the latter is fecured from the cold by his long hair, he finds nourifhment in the dead whales and feals which are caft on-fhore by the waves.

 The

The earth-worms have winter ſleep; but aquatic-worms very ſeldom. Inſects, as well as their larvæ, have winter ſleep. Butterflies may be often ſeen fluttering about in the warm days of ſpring, after having ſpent the whole winter in that condition. Amphibious animals have winter ſleep, thoſe which live merely in the ocean excepted.

Few birds, on the other hand, are expoſed to this ſtate. The greater part of theſe, on approach of winter, retire to a milder climate, where they can find more abundant nouriſhment.

In Iceland the ſheep have winter ſleep, becauſe in that country they are ſuffered to range in perfect freedom. In the winter ſeaſon therefore they may be ſeen buried under the ſnow and in the buſhes, where it would be impoſſible for them to remain were they not in that condition.

LOVE AND MARRIAGE.

MANKIND were not, in their original, divided into male and female, as at preſent; but each individual perſon was a compound of both ſexes, and was in himſelf both huſband and wife, melted down into one living creature. This union, no doubt, was very entire, and the parts very well adjuſted together, ſince there reſulted a perfect harmony betwixt the male and female, although they were obliged to be inſeparable companions. And ſo great was the harmony and happineſs flowing from it, that theſe androgynes, or men-women, became inſolent upon their proſperity, and rebelled againſt the gods. To puniſh them for this temerity, Jupiter could contrive no better expedient than to divorce the male part from the female; and make two imperfect beings of the compound, which was before ſo perfect. Hence the origin of men and women, as diſtinct creatures. But notwithſtanding this diviſion, ſo lively is our remembrance of the happineſs which we enjoyed in our primeval ſtate, that we are never at reſt in this ſituation; but each of theſe halves is continually ſearching through the whole ſpecies to find the other half, which was broken from it; and, when they meet, they join again with the greateſt fondneſs and ſympathy. But it often happens, that they are miſtaken in this particular; that they take for their half what no way correſponds to them; and that the parts do not meet nor join in with each other, as is uſual in fractures. In this caſe the union is ſoon diſſolved, and each part is ſet looſe again to hunt for its loſt half, joining itſelf to every one whom it meets by way of trial, and enjoying no reſt, till its perfect ſympathy with its partner ſhews, that it has at laſt been ſucceſsful in its endeavours.

When Jupiter had ſeparated the male from the female, and had quelled their pride and ambition by ſo ſevere an operation, he could not but repent him of the cruelty of his vengeance, and take compaſſion on poor mortals, who were now become incapable of repoſe or tranquillity. Such cravings, ſuch anxieties, aroſe, as made them curſe their creation, and think exiſtence itſelf a puniſhment. In vain had they recourſe to every other occupation and amuſement. In vain did they ſeek after every pleaſure of ſenſe and every refinement of reaſon. Nothing could fill that void in their hearts, or ſupply the loſs of their partners, who were ſo fatally ſeparated from them. To remedy this diſorder, and to beſtow ſome comfort, at leaſt, on the human race in their forlorn ſituation, Jupiter ſent down

LOVE

LOVE and HYMEN to collect the broken halves of human kind, and piece them together in the best manner possible. These two deities found such a prompt disposition in mankind to unite again in their primitive state, that they proceeded on their work with wonderful success for some time; till at last, from many unlucky accidents, dissension arose between them. The chief counsellor and favourite of Hymen was CARE, who was continually filling his patron's head with prospects of futurity; a settlement, family, children, servants; so that little else was regarded in all the matches they made. On the other hand, Love had chosen PLEASURE for his favourite, who was as pernicious a counsellor as the other, and would never allow Love to look beyond the present momentary gratification, or the satisfying the prevailing inclination. These two favourites became, in a little time, irreconcileable enemies, and made it their chief business to undermine each other in all their undertakings. No sooner had Love fixed upon two halves, which he was cementing together, and forming to a close union, but Care insinuates himself, and, bringing Hymen along with him, dissolves the union produced by Love, and joins each half to some other half, which he had provided for it. To be revenged of this, Pleasure creeps in upon a pair already joined by Hymen; and, calling Love to his assistance, they underhand contrive to join each half by secret links to halves which Hymen was wholly unacquainted with. It was not long before this quarrel was felt in its pernicious consequences; and such complaints arose before the throne of Jupiter, that he was obliged to summon the offending parties to appear before him, in order to give an account of their proceedings.—After hearing the pleadings on both sides, he ordered an immediate reconcilement between Love and Hymen, as the only expedient for giving happiness to mankind: and, that he might be sure this reconcilement would be durable, he laid his strict injunctions on them never to join any halves without consulting their favourites Care and Pleasure, and obtaining the consent of both to the conjunction. Where this order is strictly observed, the androgyne, or man-woman, is perfectly restored, and the human race enjoy the same happiness as in their primeval state. The seam is scarcely perceived that joins the two beings together; but both of them combine to form one perfect and happy creature.

MAY GAMES.

IN ancient times it was usual, on the 1st of May, for the inhabitants of London to resort to the surrounding woods and meadows to partake of the diversions called May Games, which were not confined to the lower classes, but were equally the entertainment of persons the highest rank.

On the 1st of May, 1515, King Henry VIII. and Queen Catherine, with many lords and ladies, rode a Maying from Greenwich to the high ground of Shooter's Hill, where they were received by two hundred tall yeomen, all clothed in green, with green hoods and bows and arrows.

On the invitation of the gentleman who assumed the character of Robin Hood, the king and queen, with their retinue, entered the Green Wood, where, in arbours made of boughs intermixed with flowers, they were regaled with venison and wine.

RED SNOW FOUND ON THE ALPS.

WHEN M. de Sauffure explored mount Breven, for the firft time, in the year 1760, he found in feveral places on a declivity fnow ftill remaining, and was not a little furprifed to fee the furface of it, in various parts, tinged with a very lively red colour. This colour was brighteft in the middle of fuch fpots as had their centres more depreffed than the edges, or where different planes covered with fnow feemed to be joined to each other. When he examined this fnow more clofely, he remarked that its rednefs proceeded from a very fine powder mixed with it, and which had penetrated to the depth of two or three inches, but no farther. It did not appear that this powder had come from the higher parts of the mountain, becaufe fome of it was found in places at a confiderable diftance from the rocks and much lower down; and it appeared alfo that it had not been conveyed thither by the winds, becaufe it was not difpofed in ftripes or in the form of radii. The moft probable conjecture therefore was, that it was a production of the fnow itfelf, or the remains of its partial melting fufpended at its furface as in a filtre when the water paffed through it. What feemed to favour this conjecture ftill more, was, that the colour at the edges of the hollow places where little water had funk down was extremely faint; and, on the other hand, fhewed itfelf ftronger in thofe parts where the greateft quantity of water feemed to have penetrated.

M. de Sauffure took a tumbler full of this fnow, as he had no other veffel with him, and held it in his hand till the fnow melted, when he foon faw the red duft depofit itfelf at the bottom. Its colour then did not appear fo dazzling as before, and when dry it loft it entirely: it decreafed alfo in quantity, fo as almoft to appear nothing.

Next year M. de Sauffure afcended the Breven, and found on it a quantity of the fame kind of red fnow, fome of which he fqueezed clofely together and put into a large handkerchief, but before he got home it was entirely diffolved by the heat of the fun. It was not, however, on the Breven alone that he difcovered fnow of this kind; for he found of it on all the high mountains of the Alps, about the fame feafon of the year, and in fimilar fituations; fo that he was much furprifed that authors who had written refpecting the Alps, fuch as Scheuchzer, had made no mention of it. It is, indeed, true, that it is found only in hollows, where the fnow lies deep, and at a feafon of the year when the melting of it has proceeded to a certain degree; for, when none of the fnow or when very little of it has been melted, the duft is then in too fmall quantity to attract the eye; and, if the melting has proceeded too far, the whole of the powder has paffed through with the water, and it becomes equally invifible. Befides, towards the end of the melting, a great many foreign particles and impurities, conveyed thither by the wind, are mixed with it, fo that its colour is no longer diftinguifhable.

In the year 1778, when M. de Sauffure was on mount St. Bernard, he found a great deal of the fame kind of fnow. He collected as much of it as he poffibly could; and Mr. Murrith, an experienced naturalift, collected of it alfo; fo that they were enabled to make fome experiments. On account of its great fpecific gravity, M. de

Sauffure

Sauſſure treated this red powder as an earth, firſt with diſtilled vinegar, but he employed ſo little that he had no reſult. He then boiled it in the muriatic acid, and obtained a ſolution, which, when carefully diſtilled and filtred, had ſo brown a colour that he was quite at a loſs reſpecting the nature of this ſubſtance. He therefore applied it to the blow-pipe, and obſerved that it flamed with a ſmell like that of burnt vegetables.

This experiment induced M. de Sauſſure to digeſt forty grains of the powder in ſpirit of wine; and, having filtered the ſolution, he found that the reſidue weighed ſeven grains leſs; the ſpirit of wine had become of a golden yellow colour. He then diſtilled it in a balneum mariæ, and the ſpirit of wine came off perfectly pure. An oily tranſparent matter of a golden brown colour, which by the warmth of the balneum mariæ had not become dry, remained at the bottom of the retort. This oily matter had a ſmell like that of wax, which it emitted alſo when burning. The depoſit, which the ſpirit of wine had not diſſolved, was, in regard to its extractive part, alſo inflammable; and the aſhes which remained after it was burnt, tho' they did not ſeem alkaline, were fuſed by the blow-pipe into a porous kind of greeniſh glaſs.

Theſe experiments ſeem to prove that this powder was a vegetable ſubſtance, and probably the farina of ſome flower. M. de Sauſſure was acquainted with no plant in Swiſſerland that produced red farina in ſuch abundance as to tinge the ſnow of the Alps red; eſpecially when it is conſidered that a great deal of it muſt be loſt before it can reach the ſpots where the red ſnow is found. But the action of light, perhaps, may firſt give it its red colour; and, in regard to its ſpecific gravity, that is not ſurpriſing, as by its long continuance on the ſnow it muſt, on account of the repeated ſlow meltings, receive ſuch an accumulation of particles as to become denſe and heavy.

M. de Sauſſure communicated his diſcovery to M. Bonnet, who adviſed him to examine the powder with a microſcope, in order to ſee whether it exhibited the appearance of the farina of flowers. He did ſo with the greateſt care and the beſt glaſſes, but he could not diſcover the leaſt regularity in its form.

Though M. de Sauſſure found this powder in different places on the Alps, he however aſks, whether it be very common, and whether it be found on the high mountains in different countries and different climates, ſuch, for example, as the Cordilleras? Theſe queſtions deſerve certainly to be examined; and, though it be probable that this powder conſiſts of the farina of flowers, it is not altogether impoſſible that it may be an earth ſeparated by the ſnow itſelf, and poſſeſſing ſome inflammable properties called forth by the immediate action of the light and heat of the ſun, which ſhines with ſo much livelineſs in the pure air of theſe elevated regions.

ACCOUNT OF THE NEW INSECTS SO PREJUDICIAL TO APPLE-TREES; AND A METHOD FOR EXTIRPATING THEM.

WITHIN theſe few years an inſect, before unknown in this country, has made its appearance in the Britiſh orchards, which, if means are not generally taken to root it out, will in a ſhort period deſtroy every apple-tree in the kingdom. It exhibits upon the trees the appearance of a white effloreſcence, like what may

may be sometimes seen on stones in the fields: this seems, however, to be only the habitation of the insects, which exist in millions wherever they have once lodged themselves. On bruising the efflorescence-like matter between the fingers, a deep red-coloured fluid like blood is expressed, and which probably is of that nature. Already have several valuable orchards been much injured by this insect, which corrodes the apple-trees in such a manner as at last completely to destroy their organization and to kill them, without the proprietors, many of them at least, even once suspecting the cause. We hope what we now state will be the means of making the fact generally known, and of inducing every person interested to co-operate in rooting them out.

We are happy in having it in our power to give them the recipe of a cheap composition discovered by William Forsyth, Esq. his majesty's gardener at Kensington, which has been found effectually to answer the purpose. It is as follows:

To one hundred gallons of human urine and one bushel of lime add cow-dung to bring it to the consistence of paint. With this composition anoint the trees. The present is the proper season for applying it. If the white efflorescence-like substance in which the insects are lodged has made its appearance, it should previously be brushed off.

AGRICULTURAL MISCELLANIES.

THE firing of hay, though it is stacked while too green, is less common about Newcastle than in most other parts of the country. This is owing to the following precaution being in general practice in the above neighbourhood: The farmers stuff a sack as hard as they can with hay, and tie the top tight with a cord; they then make the rick round the sack, which they pull up as the rick advances in height; and it is pulled out at the top when the rick is finished. Thus a tunnel is left in the middle of the hay, which admits a circulation of air, and prevents the heat which might otherwise occasion its destruction.

An experiment of considerable extent has been made in cultivating moss ground, belonging to the estate of Pottieshall, near Bathgate; other mosses adjoining and in the neighbourhood have also begun to be cultivated in the same manner; and it is hoped every gentleman who has moss on his lands will follow this laudable example, and give encouragement to their tenants and others to do so.

To prevent Flies teazing Horses.—Take the tops or any tender part of elder, from which express the juice, and mix it with hog's lard till it is of the consistency of promatum. Apply it to those parts the flies in general come to, and they will avoid it. The utility of this method has been often experienced in the New Forest, against the forest fly; and elder boughs will keep off smaller flies from the heads of horses.

At a time when, from a laudable principle of public spirit, exertions are making in every part of the kingdom for improving the breed of cattle, the following particulars may not be unacceptable to the practical husbandman:—In the course of the last century the Dutch, convinced by the success with which pigeons, turkies, and other

other foreign animals, had been tranfplanted into Europe, that others, when once accuftomed to the air of that quarter, might likewife become more fruitful in it, brought from the Eaft Indies a kind of fheep, larger than the common fheep of Europe, and clothed with a wool little inferior to that of England; and this kind of fheep fucceeded fo well in the Texel and Eaft Friefland, that the ewes ufed to have four lambs a-year. This agrees with the obfervation, that fheep generally thrive much better when removed from a hot to a cold climate, than when removed from a cold to a hot climate. The fheep of this fpecies, bred in the Texel, give fleeces weighing from ten to fixteen pounds, and of a wool fo long, fo fine, and fo filky, that it paffes for Englifh wool. Some of this breed, which the Dutch had permitted the Flemings to tranfport into the neighbourhood of Lifle and Varneton, fucceeded fo well, that the whole race has fince obtained the name of Spanifh fheep.

The Swedes, though fituated in a more fevere climate, tried the fame experiment on fome Englifh fheep; and with fuch fuccefs, that they now can boaft of wool of their own growth equal to that of the growth of England, or even of Spain itfelf.

In the kingdom of Thibet, which lies to the northward of Hindoftan, and is feparated from it by a range of high mountains, there is a very peculiar and extremely-valuable breed of fheep, which, in the opinion of people who have vifited the country, might prove an acquifition of vaft importance to our fettlements in the Eaft. They are of a fmall breed, not differing from our fheep in figure, except that their tails are very broad; but their fleeces, with refpect to the finenefs, length, and beauty, of the wool, are incomparably fuperior to all others yet known. The wool of thefe fheep is the material from which is manufactured the fhawl, the moft delicate woollen manufacture in the world, fo highly prized in the Eaft, and of late years well known in England. The tails of thefe fheep fell very high, and are ufed, mounted on filver handles, for brufhes to chafe away the flies. At the time Mr. Haftings left Bengal, he had fome of thefe Thibet fheep in his paddock.

The following remarks have been fent us relative to the breed of fheep in the Ifle of Man.—The rot is fcarcely known among them; but a diforder prevails, occafioned by eating a particular weed, which the Manks call *ouw*. Its leaf deftroys the liver, and in about twelve months caufes the animal's death. On opening the fheep, this leaf is found attached to its liver, and transformed into an animal having apparent life and motion, and retaining its fhape as an herb.

Spanifh Wool.—The following account of the care and treatment of fheep by the Spanifh flock-mafters, with a view to the prefervation of their wool, is extracted from a work of admitted authenticity, and may be interefting to many in this country:

In Spain there are two kinds of fheep; the coarfe-wooled fheep, who remain all their lives in their native country, and who are houfed every night in winter; and the fine-wooled fheep, who are all their lives in the open air, and travel every fummer from the cold mountains of the northern parts of Spain, to feed all the winter on the fouthern warm plains of Andalufia, Manca, and Eftramadura.

From a computation made with utmoft accuracy, it has appeared, that there are five millions of fine-wooled fheep in Spain. Ten thoufand fheep compofe a flock, which is divided into ten tribes. One

man has the conducting of all. He has authority over fifty ſhepherds and fifty dogs, five to each tribe.

The firſt thing the ſhepherd does when the flock returns from the ſouth to their ſummer downs, is to give them as much ſalt as they will eat; every owner allows his flock of 1000 ſheep 100 azoves or 25 quintals of ſalt, which the flock eats in about five months; they eat none in their journey, nor in their winter walk. This has ever been the cuſtom, and it is the true reaſon why the kings of Spain cannot raiſe the price of ſalt to the height it is in France, for it would tempt the ſhepherds to ſtint the ſheep, which, it is believed, would weaken their conſtitutions and degrade the wool. The ſhepherd places fifty or ſixty flat ſtones at about five ſteps from each other, and ſtrews ſalt upon each ſtone: he leads the flock ſlowly though the ſtones, and every ſheep eats to his liking.

Dr. Marx, an eminent German phyſician, lately publiſhed ſome experiments, ſhewing that ſo common a production as the acorn may be converted to many ſalutary purpoſes. The doctor aſcribes great medical virtues to a kind of coffee made from acorns, and the method of preparing it is as follows:—Take ſound and ripe acorns, peel off the ſhell or huſk, divide the kernels, dry them gradually, and then roaſt them in a cloſe veſſel or roaſter, keeping them conſtantly ſtirring, In doing which eſpecial care muſt be taken that they be not burnt or over-roaſted, either of which would be hurtful. The doctor recommends half an ounce of theſe roaſted acorns, ground and prepared like coffee, to be taken morning and evening, either alone or mixed with coffee and ſweetened with ſugar, either with or without milk. The author ſays, that acorns have been always eſteemed a wholeſome nutriment for men, and that by their medical qualities they have been found to cure ſlimy obſtructions in the *viſcera*, and to remove nervous complaints.

An ingenious mechanic at Mancheſter, has produced ſeveral ſpecimens of a kind of cloth made of thread obtained from the ſtalk of the common ſtinging-nettle, after being prepared exactly in the ſame manner as hemp and flax. It ſeems that the workmen who wove theſe ſpecimens, and others who have accurately examined them, are of opinion, that ſtuffs of a fine and laſting quality, warm and pliant, and of an uniform conſiſtence, may be produced in large quantities from the thread of the nettle.

A letter from Kingſton, Jamaica, ſays, "The Bourbon cane, being ſo wonderfully productive, will be a ſource of incalculable riches to this iſland; two acres and a half of them, cut on Williamsfield eſtate, in St. Thomas in the Vale, made nearly eight hogſheads of fine clear and ſtrong-grained ſugar, each hogſhead weighing upwards of 16 cwt."

Colonel Lyons, a native of Vermont, and member of Congreſs, has lately diſcovered a method of making paper of the baſs-tree, which equals that made of rags in every thing but the colour.

A manufactory is eſtabliſhing at Norwich for making ſtockings, gloves, pieces for waiſtcoats, &c. of the hair of rabbits, ſpun with ſilk to ſupply the want of length. From the ſpecimens that have been produced, it is ſuppoſed this project will prove a very advantageous undertaking.

While

While travelling in the interior of Africa, Mr. Parke had frequent opportunities of obferving the conduct of that remarkable bird, called the honey-guide, mentioned by Dr. Sparman, and other naturalifts who have travelled into Africa. It is a curious fpecies of the wokow, and derives its name from its fingular quality of difcovering wild honey to travellers. Honey is the favourite food of this bird; and, morning and evening being the time of feeding, it is then heard calling in a fhrill tone *cherr, cherr*, which the honey-hunters carefully attend to as the fummons to the chace. At laft the bird is obferved to hover for a few minutes over a certain fpot, and then filently retiring to a neighbouring bufh, or other refting place, the hunters are fure of finding the bees neft in that identical fpot, whether it be in a tree, or in the crevice of a rock. The bee-hunters never fail to leave a fmall portion for their conductor, but commonly take care not to leave fo much as would fatisfy its hunger. The bird's appetite being only whetted by this parfimony, it is obliged to commit a fecond treafon, by difcovering another bees neft, in hopes of a better falary. It is farther obferved, that the nearer the bird approaches to the hidden hive, the more frequently it repeats its call, and feems the more impatient.

GLEANING.—After all that has been faid for and againft the practice of gleaning corn, perhaps the moft conclufive arguments may be found in the following extract from Mr. Colquhoun's Treatife on the Police of the Metropolis. "If fome general regulations could be eftablifhed by law to prevent the gleaning of corn except for the benefit of the farmers, infinite advantages would arife in the prefervation of the honefty of a great number of the labouring people in the country, whofe morals are completely ruined in early life through this medium alone. Parents take their children to the fields during harveft, exhibiting an example too often to infants, which reconciles them at mature years to habits of pilfering, ruinous to themfelves and to fociety. It would perhaps be better for farmers to pay double wages to gleaners than to permit gleaning on their own account.—The mifchief arifing from it muft be obvious to every country magiftrate: it firft teaches the children of cottagers to become thieves in a little way, and afterwards ferves as a cover for more extenfive depredations; for almoft every thief, charged with ftealing corn, pretends it was obtained by gleaning."

Account of a Provifion made upon an Inclofure for fupplying the Poor with Fuel, by Edward Parry, Efq.

Upon the inclofure of the parifh of Little Dunham, in Norfolk, in the year 1794, being lord of the manor, I got a claufe inferted, directing the commiffioners to fet out a parcel of land, to be called The Poor's Eftate, to be vefted in the lord of the manor, rector, churchwardens, and overfeers of the poor, for the time being, and to be let by them for twenty-one years on leafe; the rents and profits to be laid out by them in fuel, to be delivered at the cottages of the poor in fuch proportions as the truftees fhould think proper.

Although the prejudices of the poor againft the inclofure were very great before it took place, the moment they faw the land inclofed, and let as the poor's eftate for twenty-one years, by auction, at the rate of 50l. a-year, (although eftimated by the commiffioners at only 20l. a-year,) they were highly gratified.

MEETING OF ASTRONOMERS AT GOTHA.

THE following account of the objects difcuffed by Lalande and the German aftronomers, &c. who met laft fummer at Gotha, has been publifhed by Profeffor Bode, of Berlin, in his Aftronomical Almanac for the year 1801.

In the month of January, 1798, Lalande gave public notice that he intended, in the courfe of the fummer, to make a tour to Gotha, partly to fee the celebrated obfervatory at that place, and partly to pay a vifit to his learned friend and old correfpondent Major Von Zach. On this occafion he wifhed, in particular, to form a perfonal acquaintance with feveral German aftronomers, fome of whom had long kept up an epiftolary correfpondence with him; and many of them, among whom I was one, received the moft flattering invitation to meet him.

I refolved to undertake this jaunt; to which I was encouraged, in particular, by M. Von Hahn, of Remplin, who, however, was not able to accompany me. I accordingly obtained his majefty's permiffion; and having learned that Lalande, with his niece, Madame le Français, had arrived at Gotha on the 25th of July, I fet out the 7th of Auguft by Leipfig, Naumburg, and Erfurt; and on the 9th reached Gotha, where I had the pleafure of becoming perfonally acquainted with the long-celebrated meritorious French aftronomer and his learned niece, and of embracing my worthy friend Von Zach. At the duke's court I met with the moft gracious reception; but the unfavourablenefs of the weather deprived me, in a great meafure, of the fatisfaction of ufing the noble inftruments in the obfervatory; for, during the time which I fpent there fo agreeably, the atmofphere was overcaft, and ftorms and rain prevailed. The aftronomers and others prefent were,—Profeffor Klugel, Profeffor Gilbert, and M. Pifter, fecretary of the poft-office, from Halle; Profeffor Seyffer, from Gottingen; M. Kohler, and M. Seyffert, from Drefden; M. Schaubach, from Meiningen; and M. Feer, architect, from Zurich. The other German literati, who had received an invitation, fent excufes for not accepting it.

Among the various aftronomical and mathematical objects difcuffed on this occafion were the following:

Lalande wifhed that the decimal fyftem, fome time ago propofed in France to be ufed in aftronomical and mathematical calculations, in the divifion of time and of the circle, in inftruments for long meafure, in weights, coins, &c. might be introduced into Germany. We, on the other hand, reprefented to him the difficulties, in regard to common life, which oppofed, and which would perhaps ever oppofe, the general adoption of this fyftem, otherwife ufeful in calculation; and, that men of letters were the leaft of all fit to remove thefe difficulties; we, however, agreed that in future we would favour this fyftem more in our writings, in order to make it better known; and we at the fame time expreffed a hope that the national inftitute of Paris would tranfmit to us the new tables for the decimal calculation, as foon as they were publifhed, which Lalande promifed to ufe his intereft to effect.

He mentioned alfo the general adoption of the new ftandard propofed in France, called the Metre, or the linear unity of 10,000,000 parts

parts of a quadrant of the earth's meridian; becaufe, in his opinion, it was borrowed from Nature itfelf, and therefore was equally proper for all nations. But we could give him very little hope in regard to the introduction of the metre in Germany; efpecially as the French foot is already ufed in comparing meafures, and its exact length every where known. We, however, refolved to give foreign meafures according to the metre, as we formerly gave them by the French foot, as foon as the exact length of the former fhould be made known to us by the grand meafurement, carrying on in France, but not then completed, though it has fince. We agreed alfo to give, in future, all calculations and aftronomical obfervations, as well as the places of the heavenly bodies in aftronomical books, for the mean time, as foon as the editor of the Connoiffance des Tems fhould fet us the example. Perhaps it will be poffible alfo to introduce this mean time into common life, in order to effect a better regulation of the going of watches.

Accurate and more numerous obfervations of the time of the moon's culmination were next recommended, as thefe might ferve in determining the difference of meridians of places; alfo to infert in aftronomical almanacs the time of the occultation of ftars of the 5th and 6th magnitude, before the firft and after the laft quarter of the moon, in order to give occafion to more frequent calculations of thefe differences. In calculating the oppofitions of the fuperior planets, for examining the theory of their orbits, the fame method muft abfolutely be followed; and that given in Lalande's Aftronomy, fection 4162, was here propofed.

I produced a complete drawing of the 15th fheet, and the two engraved but not yet finifhed fheets, tab. 11. and 12. of my large Celeftial Atlas, and the manufcript of my Complete Catalogue of the Stars, and particularly the part refpecting De la Caille's Southern Stars, which have never yet been numbered. Lalande took this occafion to obferve, that room might ftill be found on fome of the celeftial charts for new conftellations, and wifhed to fee inferted among the ftars an aeroftat, as the invention of the French. I embraced this opportunity, contrary to my former firm refolution of introducing no new conftellations, to propofe on the other hand, that a German difcovery, made 350 years ago, viz. the art of printing, might be perpetuated in the heavens by fome emblem. Both propofals were approved. The firft conftellation will be inferted between the Goat and Southern Fifh; and the other between the Ship, Unicorn, and Greater Dog.

Lalande was convinced, at the fame time, by ocular demonftration, of the accuracy of obfervations made with a Hadley's fextant on the Infels Berge, one of the higheft forefts of Thuringia, where the duchefs gave a fete to the company, and where we took feveral correfponding altitudes of the fun with various ten-inch fextants by Troughton, in order to determine the time and height of the pole.

Lalande had with him a chronometer by Berthoud the elder at Paris. The Duke of Gotha has in his poffeffion four Englifh chronometers, by Arnold, Emery, Mudge, &c. Major Von Zach has one by Emery; and M. Seyffert, of Drefden, one made by himfelf. All thefe were compared with pendulum clocks, and with each other; and their rate of going was found to be remarkably regular, which proved that they were fit to be ufed in determining the longitude.

tude. Seyffert alſo ſhewed, merely to give pleaſure to Lalande, a clock conſtructed by himſelf, according to a new invention, and having marked on the dial-plate the diurnal diviſion of the day propoſed in France. He had likewiſe with him, of his own workmanſhip, a ſtop-watch with the decimal diviſion, which he preſented to Madame le Français.

Some new inſtruments and maps were alſo exhibited and examined. Among theſe were an ocular heliometer, to be applied to a Herſchel's teleſcope, invented by M. Kohler, and conſtructed by M. Seyffert; the diaphragms of the former, for determining the ſtrength of the light of the ſtars, and his propoſed veſſel for an artificial water horizon; a map of the Rhein Thals, laid down by means of a Hadley's ſextant, by M. Feer, of Zurich; ſome ſheets of a new map of the Duchy of Wurtemberg, by M. Bohnenberger, of Tubingen, meaſured and delineated by means of like inſtruments. The beautiful inſtruments on the ducal obſervatory of Seeberge, near Gotha, and the convenient and proper manner in which they are erected, obliged Lalande to acknowledge that he had never ſeen any where an obſervatory ſo well furniſhed.

Of the new French calendar, and their manner of reckoning by decades, as well as their propoſed decimal diviſion of the day, there was no diſcuſſion. Lalande himſelf muſt have been aware, that as the introduction of this innovation found even in France, and particularly in the provinces, ſo great oppoſition, it would meet with much more in other countries. It would alſo hardly find admiſſion among thoſe who have ſtill any regard for inſtitutions which, thouſands of years ago, the firſt law-givers and aſtronomers declared to be proper for civil life, and which have ſince been retained through all ages. Beſides, this new French calendar, in making the year begin at the entrance of the ſun into the equinoxial point, determined by aſtronomical calculation, brings it back upon no ſolid and ſure grounds; while we, on the other hand, by the very ſimple method of intercalation, can determine common time backwards and forwards for many centuries, and differ only one day from aſtronomical time in the courſe of 3200 years.

The Elector of Saxony has enriched the obſervatory at Leipſic with a conſiderable number of aſtronomical inſtruments, which were before preſerved in the Mathematical-hall at Dreſden.

END OF THE FOURTH VOLUME.